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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 63

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MONTHLY NUCLEAR ENERGY PRODUCTION STATISTICS (MARCH 1980)

Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian Jun 80 pp 66-67

[Compilation by Elga Borri]

[Excerpts]

Paese/Impianto (1)	*Potenza (MWe lordi)* (2)	*10³ kWh (marzo)* (3)	*10³ kWh (totali dalla entrata in funzione)* (4)
ARGENTINA			
Atucha	357	0	13.739.339
BELGIO (5)			
Doel (2 x 412)	824	501.500	27.884.580
Tihange-1	920	504.000	27.922.390
Total	1.744	1.005.500	55.806.970
CANADA			
Bruce (4 x 800)	3.200	2.186.400	51.282.630
Douglas Point	220	0	11.658.877
Pickering (4 x 542)	2.168	1.491.220	120.689.340
Total	5.588	3.677.620	183.630.847
COREA DEL SUD (6)			
Kori-1	587	350.770	6.009.689
FINLANDIA (7)			
Lovisa-1	465	345.367	9.959.655
Olkiluoto-1	683	444.579	5.052.304
Total	1.148	789.946	15.011.959
FRANCIA (8)			
Bugey-1	555	375.710	23.612.190
Bugey (4 x 957)	3.828	2.262.820	22.098.600
Chinon-2	240	154.551	19.056.944
Chinon-3	415	256.125	20.658.570
Chooz (Sena)	325	112.347	20.308.347
Dampierre-1	957	3.370	3.370
Fessenheim (2 x 930)	1.860	1.317.000	26.727.822
Gravelines B-1	957	8.220	8.220
Marcoule	43	28.724	10.717.761
Monts d'Arree	75	51.974	4.707.798
Phenix	250	169.530	7.437.070
St. Laurent-des-Eaux-1	475	176.151	26.846.760
St. Laurent-des-Eaux-2	530	141.770	28.457.034
Total	10.510	5.058.292	210.440.495

Paese/Impianto (1)	*Potenza (MWe lordi)* (2)	*10^3 kWh (marzo)* (3)	*10^3 kWh (totali dalla entrata in funzione)* (4)
GERMANIA OCC. (9)			
Biblis A	1.200	0	37.084.850
Biblis B	1.300	800.730	23.779.804
Brunsbüttel	806	0	6.989.380
MZFR	57	35.928	4.248.853
Neckar	856	615.456	18.115.563
Obrigheim	345	255.420	27.344.030
Ohu	900	423.572	9.478.809
Stade-1	662	453.340	39.763.620
Unterweser	1.300	0	11.340.088
Würgassen	670	369.059	18.141.357
Total	8.096	2.953.505	196.286.354
GIAPPONE (10)			
Fugen	165	0	1.406.478
Fukushima-1	460	0	14.268.244
Fukushima (4 x 784)	3.136	1.521.805	56.085.780
Fukushima-6	1.100	788.150	5.723.190
Genkai	559	375.083	17.063.991
Hamaoka-1	540	230.529	10.674.910
Hamaoka-2	840	612.294	9.067.893
Ikata	566	421.056	9.765.026
Mihama-1	340	0	5.610.117
Mihama-2	500	370.949	16.929.083
Mihama-3	826	579.261	15.375.398
Ohi (2 x 1175)	2.350	873.900	13.380.582
Shimane	460	16.231	17.353.732
Takahama (2 x 826)	1.652	1.189.334	38.129.440
Tokai-1	166	3.256	12.856.321
Tokai-2	1.100	786.020	11.473.080
Tsuruga	357	227.432	19.805.748
Total	15.117	7.995.299	274.769.983
GRAN BRETAGNA (11)			
Berkeley (2 unità)	334,4	136.000	38.827.000
Bradwell (2 unità)	374,1	0	37.014.000
Calder Hall (4 unità)	240	84.821	35.197.076
Chapelcross (4 unità)	240	168.534	35.373.237
Dounreay PFR	250	750	811.510
Dungeness A (2 unità)	576,6	0	45.371.000
Hinkley Point A (2 unità)	663,9	420.000	50.134.000
Hinkley Point B (2 unità)	1.320	524.000	14.331.000
Hunterston A (2 x 169)	338	272.590	39.513.826
Hunterston B (2 x 660)	1.320	525.000	10.737.110
Oldbury (2 unità)	633,5	387.000	35.656.000
Sizewell (2 unità)	652,5	372.000	50.573.000
Trawsfynydd (2 unità)	584,6	400.000	47.250.000
Windscale AGR	32	24.429	3.476.291
Winfrith SGHWR	100	76.433	5.842.740
Wylfa (2 unità)	1.352	826.000	39.105.000
Total	9.011,8	4.217.357	489.162.790
INDIA			
Rapp-1	220	43.698	4.679.782
Tarapur (2 x 200)	400	119.791	19.802.672
Total	620	163.489	24.482.454

Paese/impianto (1)	*Potenza (MWe lordi)* (2)	*10³ kWh (marzo)* (3)	*10³ kWh (totali dalle entrate in funzione)*
OLANDA (12)			
Borssele-1	475,5	347.850	21.138.905
Dodewaard	54	37.430	4.269.216
Total	529,5	385.280	25.408.121
PAKISTAN			
Kanupp	137	0	2.913.934
SPAGNA (13)			
Garona	460	0	22.956.580
Vandellos	497,4	312.481	25.681.394
Zorita	160	113.900	11.528.500
Total	1.117,4	426.381	60.166.484
SVEZIA (14)			
Barsebäck (2 x 580)	1.180	783.698	27.248.390
Oskarshamn-1	460	343.263	20.084.504
Oskarshamn-2	590	432.990	19.169.580
Ringhals-1	780	536.775	17.014.773
Ringhals-2	840	236.722	21.786.677
Total	3.850	2.333.448	105.283.924
SVIZZERA (15)			
Beznau (2 x 364)	728	549.690	46.817.440
Mühleberg	336	243.780	18.359.100
Gösgen	970	484.200	5.285.700
Total	2.034	1.277.670	70.462.240
TAIWAN			
Taipower I (2 x 636)	1.272	799.283	11.441.222

Key: 1. country/plant; 2. power (MWe gross); 3. (March); 4. total since start of operation; 5. Belgium; 6. South Korea; 7. Finland; 8. France; 9. West Germany; 10. Japan; 11. Great Britain; 12. Holland; 13. Spain, 14. Sweden; 15. Switzerland

Production of Nucleoelectric Power in Italy

Plant *Impianto*	Location *Ubicazione*	Power *Potenza* *(MWe lordi)* (MWe gross)	(May) *(maggio)* *(10³ kWh)*	(31 May 1980) *(31 maggio 1980)* *(10³ kWh)*
Garigliano	Campania	160	0	12.476.382
Latina	Lazio	160	104.221	19.095.740
Trino	Piemonte	270	0	19.682.018
Caorso	Emilia	880	189.377	2.820.547
	Totale	1,480	293.598	54.074.687

OFFICIAL SPOKESMAN ON U.S. MOVES ON NUCLEAR FUEL SUPPLY

BK111558 Delhi ISI Diplomatic Information Service in English 1539 GMT 11 Sep 80

[Text] India hopes that the United States will honour its obligations by making an immediate shipment of nuclear fuel for the Tarapur powerplant despite disapproval by both the Senate and the House foreign relations committees, reports PTI.

In reply to queries from newsmen, the spokesman of the External Affairs Ministry said on 11 September the Government of India has always fulfilled all obligations under the 1963 agreement, which was a treaty between two sovereign states. India expects the United States to fulfill its obligations on its part, like India's. "This would require the immediate shipment of the already delayed consignment of fuel," he added.

The resolutions of the American Senate and House foreign relations committees to bar the sales of nuclear fuel to India were adopted despite a last minute personal appeal from U.S. Secretary of State Edmund Muskie. Commenting on yesterday's decision, the spokesman said the Government of India had noted it. These are domestic, and the process of decisionmaking with the United States. The government is only concerned with the continued implementation of the 1963 agreement, which is a treaty between two sovereign states, the spokesman said.

The spokesman said the Government of India appreciated the efforts of U.S. President Jimmy Carter to honour his country's commitment and trust he would be able to do so. "We are, however, prepared to deal with any eventuality that may arise," the spokesman said.

President Carter's executive order approving both pending shipments for an aggregate quantity of 40 tonnes of enriched uranium has a 60-day time lag. The action now rests with the House of Representatives and the Senate. Both have time to act until 1 October when the 60-day time allowed for congressional action regarding the executive order will expire.

The decision of President Carter, announced in early May, to sanction the export of enriched uranium now withheld for about 2 years was termed officially as a positive development. India took the view at that time that the ultimate test of the fulfillment of the bilateral contractual obligations for fuel supply would be its arrival. The U.S. decision was conveyed in a communication to Prime Minister Mrs Gandhi by President Carter.

CSO: 5100

ALLEGED NUCLEAR TEST WITH ISRAEL, SOUTH AFRICA DENIED

OW170929 Hong Kong AFP in English 0902 GMT 17 Sep 80

[Text] Taipei, 17 Sep 80 (AFP)--A ranking official of the Atomic Energy Council today flatly denied that Taiwan, Israel and South Africa had jointly conducted a nuclear test in southern African waters last year. Mr Cheng Chen-hua, secretary-general of the council told AFP that the report, based on the allegations of the American Central Intelligence Agency (CIA), was completely groundless. "It has reported something we ourselves don't even know about," Mr Cheng said, stressing: "It is our national policy not to manufacture any nuclear weapons and that policy remains unchanged." Major General Chen Kan-wei, the spokesman for the Defense Ministry also denied the report describing it as a (?"sensationalization").

American columnist Jack Anderson quoted a CIA report as saying yesterday that a flash detected by an American satellite over southern Africa last year came from a nuclear test carried out jointly by South Africa, Israel and Taiwan. Taiwan has been pinpointed as having the capability of making nuclear weapons, but President Chiang Ching-kuo has said his father, late President Chiang Kai-shek had rejected embarking on such a project. "We shall never use nuclear weapons against our compatriots," President Chiang is on record of having said.

Mr Cheng said repeated reports that Taiwan has the intention of manufacturing nuclear weapons have put officials here in a somewhat annoyed position. Admitting that some reports meant well to indicate Taiwan's increasing strength, others, he said, were maliciously motivated. Mr Chen confirmed, however, the state-run Taiwan Power Company (TPC) has signed a long-term agreement with South Africa for the purchase of uranium for use at Taiwan's nuclear power plants. The TPC measure was a diversification of the sources of raw material, Mr Cheng explained. Taiwan also buys uranium from the United States and Canada.

CSO: 5100

BRIEFS

ISRAELI ON IRAQI BOMB--Foreign Minister Yitzhaq Shamir has recently appealed to his Italian counterpart, asking him to intervene to prevent the supply of Italian know-how to Iraq for the production of a nuclear bomb. In a personal letter to Italian Minister Emilio Colombo, Shamir points to the dangers to stability in the Middle East and to Israel's existence inherent in an Iraqi nuclear bomb. According to a comprehensive agreement between Italy and Iraq on cooperation in the nuclear sciences, Italy is supplying Iraq with a scientific instrument that may aid in the production of a plutonium bomb. Italy is also giving scientific and technological training to Iraqis working on the nuclear research program. Foreign Minister Shamir appealed to Colombo on behalf of the friendship formed between them when they both headed their countries' parliaments and took personal action to prevent a nuclear catastrophe in the region. [Text] [TA071007 Tel Aviv YEDI'OT AHARONOT in Hebrew 7 Sep 80 p 8]

JAPAN-CANADIAN ATOMIC ENERGY PROTOCOL--Tokyo, 3 Sep (KYODO)--Japan and Canada have agreed on the protocol amending the bilateral governmental agreement for cooperation in the peaceful uses of atomic energy, the Foreign Ministry announced Wednesday. Notes on the amendment were exchange in Ottawa Wednesday Japan time, and the protocol came into force on the same day, the ministry said. [Text] [Tokyo KYODO in English 0401 GMT 3 Sep 80 OW]

CSO: 5100

BRIEFS

JAPAN-AUSTRALIAN URANIUM AGREEMENT--Osaka, 8 Sep (KYODO)--Four Japanese companies, including three electric power firms, Monday signed an agreement in Japan with Energy Resources of Australia (ERA) for long-term purchase of natural uranium as well as investment in the Australian company. The four companies are Kansai, Kyushu and Shikoku electric power companies and C. Itoh and Company. ERA is planning to develop the Ranger uranium ore mine with proven uranium ore deposits totaling 120,000 tons--one of the world's largest uranium ore mines--located in northern Australia. Under the agreement, the Japanese firms will invest 41 million Australian dollars or a 10 percent share in ERA, and will extend a dollar 140 million loan to ERA to help finance the development of the mine. ERA, in return, will deliver a total of about 15,000 short tons of uranium ore concentrate--yellow cake--to the four Japanese partners over 15 years starting in 1982. The Japanese firms have the option to double their annual imports of yellow cake to 2,000 short tons from 1990. [Excerpt] [Tokyo KYODO in English 1258 GMT 8 Sep 80 OW]

CSO: 5100

BRIEFS

URANIUM PROJECT--Deputy Prime Minister Anthony today formally assigned the government's interests in the Ranger uranium project to the company Energy Resources of Australia [ERA]. Mr Anthony said ERA had brought with it sales contracts with West Germany and Japan worth more than U.S. $2,000 million. This represented one of the largest export sales ever recorded for a single commodity by any Australian company. The government announced 12 months ago that it was examining proposals to sell its interests in Ranger. [Text] [Melbourne Overseas Service in English 1130 GMT 12 Sep 80 OW]

CSO: 5100

BRIEFS

ATOMIC STATION SITES--Bangalore, July 1--The Chief Minister, Mr R. Gundu Rao, informed the Legislative Council today that a Central team had chosen two sites, one of the foreshore of Tungabhadra reservoir and another near Talakalale reservoir at Sharavathi in Karnataka as suitable for the location of an atomic power station. Making a statement in response to a calling attention notice tabled by Mr Abdul Sattar Sait (Cong-I) the Chief Minister said both the sites chosen had adequate water. The team had apprised the Centre of the suitability of the sites for its consideration when the next atomic power station was to be installed in the southern region. A gestation period of 15 years was required for developing the indigenous know-how. In view of it, it was necessary to make a beginning now for the location of the next atomic power station in Karnataka for providing an alternative source of energy at least by 2000 AD, he said. [Text] [Madras THE HINDU in English 2 Jul 80 p 1]

CSO: 5100

JAPAN

BRIEFS

ISHIKAWA ATOMIC POWER STATION--Osaka, 4 Sep (KYODO)--Three electric power companies are jointly planning to locate a giant atomic plant with the combined output capacity of 10 million kilowatts or more in the Japan seacoast city of Suzu, Ishikawa Prefecture. Shoichiro Kobayashi, president of the Kansai Electric Power Co, made known the massive project to newsmen Thursday. The three firms are Kansai, Chubu and Hokuriku electric power companies. However, Kobayashi said the three utility firms have not yet reached agreement on when to signal a go-ahead for the project. Kobayashi said there are no plans for the presidents of the companies to meet and discuss the project in the near future. If the project is realized, Suzu would be Japan's largest base on nuclear power generation, exceeding Fukushima where Tokyo Electric Power Co owns two atomic power stations with the targeted capacity of 8 million kilowatts. [Text] [Tokyo KYODO in English 0119 GMT 5 Sep 80 OW]

NUCLEAR FUELS LEAK DENIED--Mutsu, Aomori Prefecture, 11 Sep (KYODO)--The nuclear fuel for the ship Mutsu which is being stored at Ominato Port here poses "no threat to the public," the head of the Mutsu regional office of the Japan Nuclear Ship Development Agency said Thursday. His comments followed the revelation Monday that two fuel assemblies contained 121 nuclear fuel rods had been stored at the port since 1972 without the knowledge of prefectural government officials or of local residents. The nuclear-powered ship Mutsu was formerly based on Ominato, but is now undergoing repairs at Sasebo, Nagasaki Prefecture. "There is a tiny amount of radiation leakage, but this is no danger," said Kunitake Fukazawa, head of the regional office. "We have taken strict precautions against earthquakes and fires, and as long as we continue our firm management there will never be any danger." He stressed that the facilities were subject to regular check by the Nuclear Ship Development Agency and the Science and Technology Agency, and he strongly denied that there was any attempt at a "cover-up." He also revealed that six drums containing low-level nuclear waste were kept at the site. However, workers had to wear special protective clothing, and there was no risk of leakage. [Text] [OW110927 Tokyo KYODO in English 0920 GMT 11 Sep 80]

CSO: 5100

BRIEFS

CHILE-BRAZIL NUCLEAR AGREEMENT--Brasilia, 8 Sep (AFP)--Fernando Zegers, the Chilean ambassador in this capital, revealed here today that Chile is interested in signing a nuclear cooperation agreement with Brazil. Zegers made this announcement when commenting on the visit Brazilian President Gen Joao Baptista Figueiredo will make to Santiago from 8 to 10 October, during which several agreements to expand bilateral cooperation will be signed. Zegers added that the Chilean authorities are not concerned about the number of agreements to be signed but with their scope, since their main objective is to intensify Brazilian-Chilean political and economic relations. [Text] [PY091716 Paris AFP in Spanish 1526 GMT 8 Sep 80]

CSO: 5100

ARGENTINA

AIMS, ACHIEVEMENTS OF BALSEIRO ATOMIC INSTITUTE OUTLINED

Buenos Aires CONVICCION in Spanish 17 Aug 80 p 16

[Text] Some days ago, as the celebrations were beginning for the 25th anniversary of the Balseiro Institute in San Carlos de Bariloche, another significant development was taking place: a new academic year was starting at that center for advanced nuclear studies, which when it concludes in 1981, will graduate the first class of nuclear engineers and the 23rd of master's degree holders in nuclear physics. These three figures bear witness to how seriously the country has gone about training the personnel it needs to handle the various stages required to tame the power of the atom. Twenty-three graduating classes of specialized physicists, a total of almost 250 professionals, have been the underpinning of our highly skilled scientific research, which will be expanded next year by a group of young professionals who will consolidate the new development stages of atomic energy in our country. The nuclear engineers who will graduate in 1981 are to join the ranks of highly esteemed pioneering figures. Next year, Argentina will take another step towards mastery of the atom and self-sufficiency.

One of the pioneers in work with the atom was Dr Jose A. Balseiro, the founder and first director of the institute that bears his name, who died prematurely in 1962. Emerging amid confusing circumstances (it was Balseiro himself who produced the report that banned Richter's nuclear venture on Huemul Island), the institute was established by an agreement between the National Atomic Energy Commission and the University of Cuyo in August 1955. According to Dr Guido Beck, the Balseiro Institute, an independent model school, was able to set the minimum standards for university education that the University of Buenos Aires had to attain in the field of physics when its departments were overhauled after 1955. With this outstanding record, the Balseiro Institute is today a top-ranking advanced studies center and a firm base of support for the nuclear energy prospects of our country and of our sister nations in Latin America as well.

High-Level Specialization

Because of its goals, its demanding curriculum and the lifestyle that prevails there, and also because it shares the facilities of the National Atomic Energy Commission's (CNEA) Bariloche Atomic Center, the Balseiro Institute is an exception in Argentina's university system. It stands out from the rest by the mere fact that it has carried on its activities for a quarter of a century, untouched by the conflicts and interruptions that affected others.

Whereas the student enrolment barely tops 100, teaching and research personnel number 92. Students enter after having completed 2 years at another school as majors in physics, engineering or related disciplines. They receive a CNEA scholarship, reside at the institute itself and follow an intensive study and laboratory work schedule. The entrance requirements are tight: after several selection stages, about 30 of the 600 applicants are accepted; the final number depends on the institute's teaching capacity. The dropout rate, however, is one of the lowest in the country, and the CNEA guarantees employment at its professional center to all graduates.

The Balseiro Institute was created, according to Dr Jose F. Westerkamp, as an attempt to mitigate the impact of the previous decade's university crisis and to guarantee the necessary conditions for the development of advanced studies.

Its main objectives are to meet the demand for highly specialized professionals generated by the CNEA's growing activities and to help raise the scientific standards in the field of physics in our country. To this end, it gives physicists a solid and wideranging general background as well as specialized training that will introduce them to research work. Since 1977 it has also been educating nuclear engineers with specific training to tackle the problems and designs of nuclear powerplants. It offers master's degrees in physics and nuclear engineering and doctorates in physics and engineering.

Exceptionally Intense

University life at the Balseiro Institute presents unusual features for our country. Students devote themselves exclusively to their studies and live about 10 months out of the year on campus. The student-teacher ratio is very low (almost one to one), and the classroom and laboratory are considered workplaces for learning and discussion, with active participation by students encouraged. Within this system final examinations are relatively less important than the results of individual and group work throughout the school year. The institute places a great deal of emphasis on education by experimentation, without disregarding theory.

One of the major stimuli in the institute's teaching activities is the ongoing interaction between its educators and students and the CNEA's Bariloche Atomic Center, where significant research work is being done. The main lines of work are solid-state physics (theory, metals, low temperatures, resonance), atomic physics, particle physics, theoretical high-energy physics and the theory of general physics. Among the equipment in its laboratory are two Cockroft Walton accelerators, a Van de Graaff generator and an IBM 360/44 computer.

The applied research program being carried out at the Bariloche Atomic Center involves intensive interaction between researchers and industry through a system of contracts. The programs remain consistent with those of the CNEA. Among the fields in which work is going on are the properties of combustible elements, extractive metallurgy, frontier technologies for the electronics industry, process simulation, etc. This provides a very special framework for educational activities and has an impact on the professional profile of Balseiro Institute graduates. During the first 24 years of its existence, 246 students graduated with master's degrees in physics, and 114 of them completed their doctoral dissertation. In 1980, 58 of the 92 educators working there were former students. Fifty-eight foreign students have studied or majored at the institute.

The characteristics of life at the institute (the organization, length and intensity of studies, room-sharing in a dormitory, separation from family and distance from major urban centers) require a considerable effort at adaptation by students, as well as strict discipline and dedication to work.

The Nuclear Engineering Program

The nuclear engineering program was set up in 1977, in light of the country's urgent need for specialists in the construction of nuclear powerplants, inasmuch as this form of energy is an essential part of our energy future. The program's objective is to train personnel for the following activities: reactor and nuclear installation engineering; scientific and technological research in the field of reactors, fuels and components, as well as the auxiliar facilities of the nuclear industry.

The nuclear engineers who will graduate next year will have broad-based training in fields such as the generation and harnessing of nuclear power; the problems of nuclear reactors and their operation; radiation, shielding and radioactive wastes (including the uses of radiation and protection against its undesirable effects); instrumentation and detection; the various aspects of handling and monitoring nuclear power; nuclear materials and fuels under study and in production; thermal aspects of reactors, including maintenance and performance problems, and finally, design in the nuclear industry.

The graduation of the first engineers at the Balseiro Institute is another milestone in the history of nuclear energy in Argentina and it appreciably expands the decisive human resources sector, a sector that once again highlights the difference between nuclear research and development, in which there has been a definite continuity, and the sad overall panorama (with few exceptions) of general scientific training and research in our country.

8743
CSO: 5100

ARGENTINA

NATION TO PROCEED UNDETERRED WITH NUCLEAR PLAN

Buenos Aires CONVICCION in Spanish 17 Aug 80 p 16

[Article by Julio Orione]

[Text] In a speech at the Buenos Aires Stock Exchange Vice Adm Carlos Castro Madero, the president of the National Atomic Energy Commission (CNEA), underscored the consistency and determination with which Argentina is pursuing the objectives of its Nuclear Plan. The goal of nuclear self-sufficiency (one of those basic objectives) is becoming more clearly defined all the time. For example, the CNEA president referred in his speech to the important question of reprocessing uranium, in other words, obtaining plutonium as a fuel. This is one of the points of controversy with the powers of the London Club because plutonium is an essential element in the destructive uses of the atom. Nevertheless, in order for Argentina to feel as secure in its nuclear power future as it is in today's first stage of the Nuclear Plan, it must also have the potential in the years to come to construct fast breeder reactors.

Vice Adm Castro Madero explained about the construction of the pilot reprocessing plant that the CNEA is putting up in Ezeiza (a development that caused a major stir in the United States 2 years ago when the decision to build it was announced) and said, in answer to a question from CONVICCION, that "if the fuel is ready, we can anticipate that plutonium will be used in one of the Nuclear Plan's four powerplants," which will go on line in 1987, 1991, 1994/5 and 1997. In any case, as the CNEA president has argued on a number of occasions, because of Argentina's uranium supplies we are under no urgent pressure to resolve the issue.

For the same reason, Argentina will not have major problems with its radioactive wastes, since for now they can be stored in the waste storage tanks. "For the future," Castro said, "the country is looking for the places that are best suited for the burial of the wastes from reprocessing plants; this is being done opportunely and with a view towards maximum safeguards." He clarified that the wastes would be vitrified and buried at appropriate sites, such as salt mines or granitic formations that do not undergo verifiable geological alterations for very long periods of time.

The president of the CNEA said that the Argentine people have no reason to be concerned about hazardous radiation, offering two explanations. First, Argentina is engaged in exclusively peaceful nuclear activities, which carry inherently fewer risks for the populace. Second, the CNEA's safeguards policy is regarded as an essential part of Argentina's nuclear development and is implemented by our experts with particular efficiency. Castro Madero said in this regard that Argentina's situation is very different from that of the major powers, "where the populace is entitled to be concerned, in light of the results of military nuclear programs." In Argentina, "nuclear-related risks are comparable to the dangers of everyday life."

We can see how important nuclear power is in our country from the percentage of Argentina's electricity it produces. Although nuclear power accounted for 4 percent of operating capacity, last year it generated 10 percent of total power. Another fact: Atucha generates the least expensive energy in Argentina today. This points up, without the need for further comment, the admirable results of 30 years of CNEA activities, but it is just a sample of the wideranging possibilities that the Nuclear Plan offers. For example, Argentina could soon become an exporter of nuclear technology. In fact, it already is, since it setting up a pilot reactor in Peru, which Castro Madero described as a momentous development in that it is the first "horizontal" nuclear transfer "between two developing countries."

Castro also said that "although Argentina will not be in a position for several years to export nuclear technology at the atomic powerplant level, we can export another type of plant, even using the turnkey system. Furthermore, the country sends experts to other developing countries, at the request of the International Atomic Energy Agency."

Just as the decision to use natural uranium enabled our country "to end its dependence on or political subordination to other nations, Argentina is quickly acquiring the capability of mastering the fuel cycle," in search of the broadest possible nuclear self-sufficiency. Achieving it, Vice Adm Castro Madero confirmed, is not just the CNEA's job. "This is a nationwide effort," he said, "in which national industry and our researchers and technicians must play a leading role, since they are the basis for scientific and technological continuity," and this effort will guarantee the attainment of the objectives of Argentina's Nuclear Plan.

8743
CSO: 5100

BRIEFS

EGYPTIAN-ARAB COOPERATION IN NUCLEAR ENERGY--Kuwait, 13 Sep (KUNA)--Chairman of the Egyptian Atomic Energy Authority Dr Ibrahim Hammudah said in an interview published here today that Arab countries are capable of producing a nuclear bomb provided they worked collectively and wished to do so. He told AL-QABAS that this also requires the bringing together of material, technical and scientific resources and comprehensively collating them, together with Arab scientists and their specialization in nuclear work. Dr Hammudah called for Arab cooperation in the nuclear field because "the future is with nuclear energy" which will be the main alternative to oil if not its major competitor. He said the building nuclear powerplants is very necessary because "from the economic aspect, building them equals the cost of producing energy by traditional plants which depend on oil. Moreover, they will be cheaper due to the continuing increase in oil prices." He said it is difficult to be certain whether Israel had a nuclear bomb unless it carries out a nuclear test "and as long as no nuclear test has been carried out the existence of nuclear weapons becomes mere speculation." However, the Egyptian scientists added, enough information is available about a nuclear reactor which Israel owns "which shows that it is possible to produce the necessary material for an atomic bomb." [Text] [LD130842 Kuwait KUNA in Arabic 0732 GMT 13 Sep 80]

CSO: 5100

NIGER

URANIUM PRICE DECLINE THREATENS ECONOMY

Kaduna NEW NIGERIAN in English 26 Aug 80 p 12

[Text]

GRIPPED by outward forces which it can do little to control, Niger is today prey to major uncertainty and worry over the consequences which could come from the drop on the world market for uranium.

For an impoverished country, the drop in prices which form a mere statistic on the daily quotations list could be catastrophic, for uranium sales constitute one of the country's principal resources and feed the National Investment Fund.

A drop in receipts from these sales might force the government to revise the objectives of the current Five Year Plan, President Seyni Kountche warned in a speech marking the country's 20th anniversary of independence this month.

Much vital investment cash has gone into developing the uranium deposits and now these are strongly threatened with becoming very low yielding, if the market slump continues. The result will be stagnation for Niger's economy.

For the head of state "there will surely be a difficult and disagreeable moment to overcome", and he denounced those "economic [illegible]" gambling [illegible] against uranium.

As European Economic Community Commissioner for Development, Claude Cheysson put it: "Just at the point of take-off, Niger risks knowing some serious setbacks".

URANIUM OPERATORS

Two companies—Somair and Cominak—currently exploit the African country's uranium. Somair, set up in 1968 with a capital of [illegible] million cfa francs, groups Niger's partners (Onarem) who holds 19 per cent, France's Atomic Energy Commission subsidiary Cogema, the CFMU, Minatome and Mokta, West Germany's Urangesellschaft, and the Italian company, Agip Nucleare. The organisation exploits open-cast mines in the Air mountains where uranium deposits were discovered by the French Atomic Energy Commission.

CSO: 5100

BRIEFS

ATOMIC POWER ENGINEERING--Leningrad, 6 Sep (TASS)--Yet another super unit of atomic power engineering is being created by the Leningrad Elektrosila Association. Work began here today on the assembly of the stator of a 1 million kw capacity generator. The first "millionaires" are the prototypes of a new series. They will replace the traditional "twin" 500,000 kw turbogenerators with which existing atomic stations are equipped. [Text] [Moscow TASS International Service in Russian 1136 GMT 6 Sep 80 LD]

ATOMIC POWER PLANT COMPLETION--The construction of the biggest Soviet atomic power station near Leningrad has entered its final stage. A fourth reactor with a capacity of 1 million kilowatts is being assembled. A series of new stations will be equipped with such reactors. The stations are designed to solve the problem of supplying with energy the industrial European part of the Soviet Union. The experience of operating atomic power stations in the Soviet Union proves their safety. International committees conducting regular checkups at them have not discovered any violations of safety regulations. [Text] [Moscow Radio in English to Great Britain and Ireland 2000 GMT 12 Sep 80 LD]

CSO: 5100

RADIOACTIVE WASTE DISPOSAL PROCEDURES, FACILITIES

Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian May 80 pp 37-54

[Article by S. Gagliardi and M. Rossi, of the Central Operating Department of the CNEN (National Nuclear Energy Commission): "The Situation of Radioactive Wastes in Italy--Accumulation, Production and Means Available for Processing Them"]

1. Introduction

The purpose of this article is to present an up-to-date report on the situation of radioactive wastes in Italy as regards the quantities accumulated and produced.

The following has been done in particular:

--a census of the radioactive wastes lying on Italian soil through 1978;

--an inventory of the existing facilities for management of radioactive wastes.

The investigation was carried out on the basis of the data in the possession of the CNEN, especially the data and elements collected in a preceding investigation carried out in 1974--RTI/ISA [expansions unknown] (75)--and where these did not prove sufficient, through on-the-spot inquiries and/or contacts with the individual producers.

2. General List of of Centers of Nuclear Activity in Operation and Under Construction in Italy Today and of Users of Radioisotopes in General

Table I and Figure 1 give, respectively, a general list of the centers of nuclear activity in operation and under construction in Italy today and their geographical location.

Table II gives the regional breakdown of the users of radioisotopes in function of type of use. The data relate to about 60 percent of the total of users--those for whom sufficiently complete information is available.

Table I. General List of Italian Centers of Nuclear Activity

Nuclear Electric Power Plants

- Nuclear electric power plant of Trino - ENEL [National Electric Power Agency]
- Nuclear electric power plant of Caorso - ENEL
- Nuclear electric power plant of Latina - ENEL
- Nuclear electric power plant of Garigliano - ENEL

Industrial Installations

- SORIN [expansion unknown] Center, Saluggia
- COREN [expansion unknwon] SpA [Inc], Saluggia
- EUREX [expansion unknown] installation, Saluggia - CNEN
- Fabbricazioni Nucleari [Nuclear Fabrications] SpA, Bosco Marengo
- CONU [expansion unknown] AGIP [National Italian Oil Company], Trisaia

Research Centers, Laboratories, Reactors

- CCR [expansion unknown] EURATOM, Ispra
- LFCEC [expansion unknown], Saluggia - CNEN
- CESNEF [expansion unknown], University of Milan
- CISE [expansion unknown], San Donato Milanese
- LENA [expansion unknown], University of Pavia
- LFN [expansion unknown], University of Padua
- Montecuccolino Center, Bologna - CNEN
- AGIP Medical Research Center (Bologna)
- Fiascherino Laboratory - CNEN
- Nuclear Geology Laboratory, Pisa - CNEN
- CAMEN [Center for Military Applications of Nuclear Energy], Pisa
- CSN [expansion unknown], Casaccia - CNEN
- LNF [expansion unknown], Frascati
- CRN [Nuclear Research Center], Trisaia - CNEN
- IAIN [expansion unknown], University of Palermo

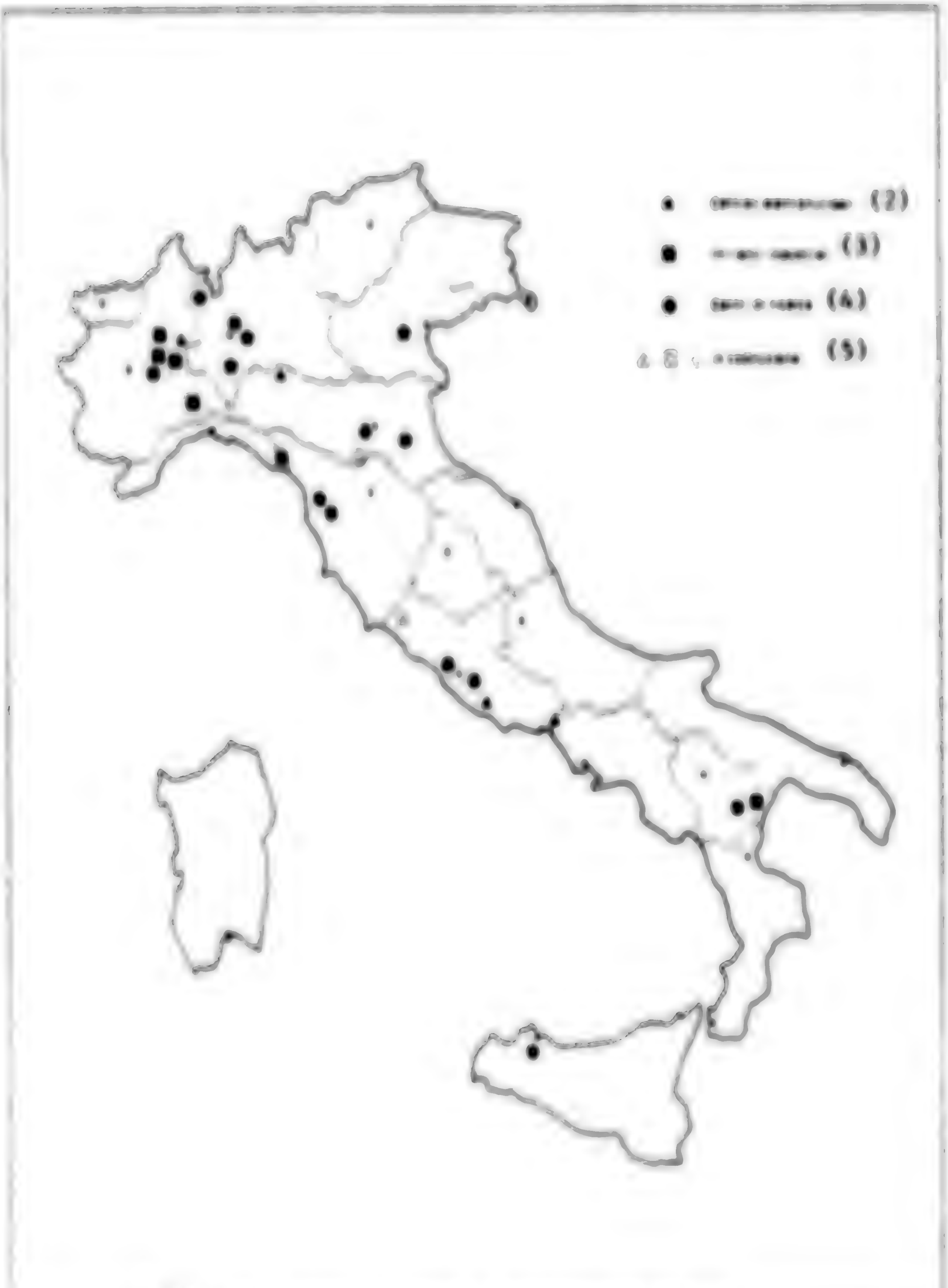
Centers under Construction or Due to Go into Operation Soon

- Nuclear electric power plant of Montalto di Castro - ENEL
- Brasimone Center (PEC [expansion unknown] project) - CNEN

3. Census of Radioactive Wastes Accumulated through 1978 and Short-Term Production Forecast

The Italian producers of radioactive wastes are listed in Table III, while the location of the principal ones is given in Figure 2, in which the individual producers are indicated in function of their importance from the wastes-production point of view.

In order to proceed in an organic manner in carrying out the census of the radioactive wastes accumulated and forecasting the short-term production,



(1) Fig. 1 - [illegible]

Key:

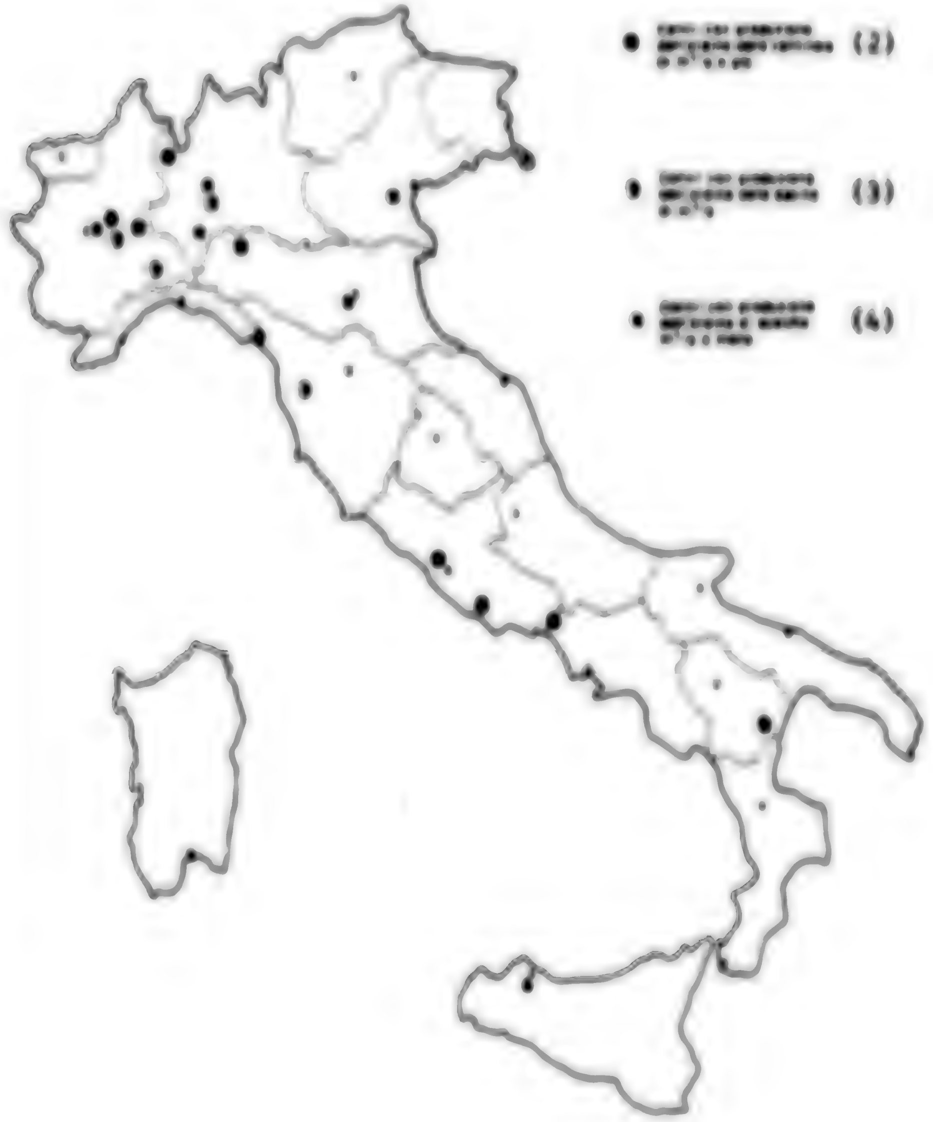
1. Figure 1 - Geographical distribution of Italian centers of nuclear activity 2. Nuclear electric power plants 3. Industrial installations 4. Research centers 5. under construction

Table 11. Regional Breakdown of the Users of Radioisotopes

Regione (6)	(1) Numero di utilizzatori				
	(2) per Usi Industriali e di Ricerca				(3) per Usi Medici
	(4) di sole sorgenti sigillate di attività		(5) di sorg. sigill. e non sigill. di attività dell'ordine dei		(5) di sorg. sigill. e non sigill. con attività dell'ordine dei
	≤ 0,1 Ci	> 0,1 Ci	μCi/s	mCi/s	mCi/s
Valle d'Aosta	1	1	–	–	–
Piemonte	15	17	2	2	29
Lombardia	25	57	4	10	58
Liguria	3	9	–	–	17
Veneto	4	5	3	13	32
Trentino A.Adige	1	1	–	–	1
Friuli V.G.	9	5	–	–	7
Emilia Romagna	8	18	3	4	44
Toscana	13	11	2	9	38
Lazio	15	12	3	10	56
Umbria	1	2	–	–	11
Marche	1	–	–	–	12
Abruzzi	–	1	–	–	4
Campania	10	6	4	15	30
Puglie	5	6	1	–	17
Calabria	–	3	–	–	9
Lucania	2	2	–	–	1
Sicilia	2	11	3	4	44
Sardegna	3	9	–	–	11
Totale (7)	118	176	25	67	415

Key:

1. Number of users 2. for industrial and research uses 3. for medical uses 4. solely of sealed sources with activity of: 5. of sealed and unsealed sources 6. Region 7. Total



(1) Fig. 2 – Distribuzione geografica dei principali produttori di rifiuti radioattivi

Key:

1. Figure 2 - Geographical distribution of principal producers of radioactive wastes 2. Centers with production on order of hundreds of m³ per year 3. Centers with production on order of tens of m³ per year 4. Centers with production on order of a few m³ per year or less

Table III. General List of Producers of Radioactive Wastes

Nuclear Electric Power Plants

Nuclear electric power plant of Trino - ENEL
Nuclear electric power plant of Caorso - ENEL
Nuclear electric power plant of Latina - ENEL
Nuclear electric power plant of Garigliano - ENEL

Industrial Installations

SORIN Center, Saluggia
COREN SpA, Saluggia
EUREX installation, Saluggia - CNEN
Fabbricazioni Nucleari SpA, Bosco Marengo

Research Centers, Laboratories, Reactors

CCR EURATOM, Ispra
LFCEC, Saluggia - CNEN
CESNEF, University of Milan
CISES, San Donato Milanese
LENA, University of Pavia
LFN, University of Padua
Montecuccolino Center, Bologna - CNEN
AGIP Medical Research Center (Bologna)
Fiascherino Laboratory - CNEN
CAMEN, Pisa
CSN, Casaccia - CNEN
LNF, Frascati
CNR, Trisaia - CNEN
IAIN, University of Palermo

Users of Radioisotopes

See specification in Table II.

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the wastes have been subdivided, within the limits of the possible, by "type of waste," as presented in Table IV, and each type was then assigned to the category to which it belongs on the basis of the IAEA [International Atomic Energy Agency] classification (Standardization of Radioactive Wastes Categories - Vienna 1967). This is because the IAEA classification is based solely on quantification of physical parameters (concentration of activity or doses) that permit characterization of radioactive wastes essentially from the radiological-protection point of view, whereas in order to deal with the problems of management of radioactive wastes (collection, transport, processing, packaging and storage) it is essential to know, in addition to the characterization of the waste from the radiological-protection point of view, the characteristics of the contaminated medium. Furthermore, in view of the fact that in recent years there has been increasing emphasis on the necessity of keeping radioactive wastes contaminated by transuranic elements separate from the other radioactive wastes, because of the fact that both the handling and the ultimate disposition differ considerably depending on whether transuranic elements are present or absent, the presence of transuranic elements has been indicated when such was the case.

Table IV. List of the Types of Radioactive Wastes

Liquids

--Aqueous liquids (solutions and/or suspensions of inorganic and/or organic compounds in water)

--Organic liquids (solvents, oils, etc, and solutions and/or suspensions of inorganic and/or organic compounds in them)

--Others

Solids

--Compressible combustible solids (paper, cardboard, rags, cotton, wooden or plastic pieces that have cavities and/or voids to a significatnt extent in relation to total volume)

--Incompressible combustible solids (wooden or plastic pieces that do not have cavities and/or voids to a significant extent in relation to total volume)

--Compressible noncombustible solids (metal cans and can-type containers, glass, ceramic pieces and similar things that have cavities and/or voids to a significant extent in relation to total volume)

--Incompressible noncombustible solids (metal pieces that are not cans or can-type containers and glass, ceramic pieces, etc, that do not have cavities and/or voids to a significant extent in relation to total volume)

--Solids and semisolids resulting from processes (muds, ashes, natural exchangers, etc)

--Ion-exchanger resins

--Filters from ventilation installations

--Large-dimension solids (parts of plant, equipment, machines, etc)

--Others

In the following sections, the existing situations for the principal producers of wastes are examined.

3.1. Nuclear Electric Power Plant of Trino

3.1.1. Aqueous Liquids, IAEA Category 1

These come from decontamination of components, from the active scrubbing, and from the drainage. These wastes are normally discharged into the Po River without any processing beforehand.

Production: 3,000-4,000 m^3 per year
Specific activity: $\leqslant 10^{-6}$ Ci/m^3

3.1.2. Aqueous Liquids, IAEA Category 2

These come the primary-liquids tanks and are treated with ion-exchanger resins.

Accumulation: zero
Production: 1,000-2,000 m^3 per year
Specific activity: $10^{-6} - 10^{-5}$ Ci/m^3

3.1.3. Compressible Solids, IAEA Category 1

These come from reactor maintenance and decontamination operations and from the running of the reactor-support laboratories; the ventilation filters are included among these wastes too. They are put into drums by pressing, which reduces their volume in the ration of about 5:1. The drums containing wastes are stored in a suitable yard, and some of them are stored under a roof cover; a storage shed is under construction.

Accumulation: 291 m^3 (compacted) = 1,457 drums
Specific activity: (^{60}Co, ^{137}Cs, ^{134}Cs, ^{54}Mn):
10^{-3} - 2 mCi/drum
Production: 20-60 m^3 per year (compacted) = 100-300 drums/year

3.1.4. Blocks, IAEA Categories 1-2

Some types of wastes, such as the muds, resins, scrap metal, ventilation filters, etc, have been enclosed in concrete either in 200-liter drums or in 1-m^3 containers.

Accumulation: 105 m^3
Activity: 0.1-3 Ci/m^3
Production: 2-4 m^3 per year

3.1.5. Large-dimension Solids, IAEA Categories 1-2-3

These consist of components of the reactor's internal structures removed in the course of repairs carried out at the end of the first fuel cycle. Table V gives a list of such components. They are stored in two pools. Further production of such wastes is not foreseen for the short term.

3.1.6. Exchanger Resins, IAEA Categories 1-2-3

These come from the systems for purification of the primary circuit and from the waters of other systems. They are contained in ad-hoc containers which, once the resins are exhausted, are stored in the yard referred to under 3.1.3. or left in their operating pool.

Table V. List of Large-Dimension Solid Wastes Produced at the Trino Power Plant

	N°	(1) Dimensioni	Volume m³	(2) Peso kg	Attività spec. media Ci/kg (3)	Attività totale Ci (4)
Settore di schermo termico (5)	3	320 x 104 x 7,5	0,266	2.075	0,482	3.000
Settore di schermo termico (5)	27	320 x 26,6 x 7,5	0,068	530,3	0,482	6.900
Trucioli provenienti dal taglio dei settori di schermo termico (6)	–	–	0,760	510	0,482	245
Capsula cilindrica contenente viti, tiranti, tubi guida strumentazione nucleare, cestelli porta campioni, ecc. (7)	9	ø 5; h 120	0,0024 *	6,41 *	0,013	0,75
Idem c.s. (8)	10	ø 15,2; h 180	0,033 *	89,1 *	0,013	11,58
Idem c.s. (8)	18	ø 15,2; h 120	0,022 *	60 *	0,013	14,04
Capsula cilindrica contenente il filtro dell'eiettore impiegato per la pulizia della cavità del reattore e del recipiente a pressione (9)	1	ø 30,3; h 200	0,144 *	180 *	0,48	86,4
Capsula contenente tubi di guida del sistema "aero-balls" (10)	2	ø 30; h 180	0,220 *	28,5 *	200	5 700
Capsula dei campioni di acciaio del recipiente a pressione sottoposti a irraggiamento (11)	8	ø 5; h 120	0,0024 *	6 *	0,667	32
Piastra della strumentazione nucleare (12)	1	ø 277,5 h 16,5	0,997	1.380	5×10^{-3} *	3,58

* Value refers to contents.

Note: The radioactive contamination is due essentially to ^{60}Co.

Key:

1. Dimensions 2. Weight 3. Mean specific activity 4. Total activity 5. Heat-screen sector 6. Chips from cutting of the heat-screen sectors 7. Cylindrical capsules containing screws, rods, nuclear-instrumentation guide tubes, sample boxes, etc 8. Idem, as above 9. Cylindrical capsule containing the filter of the ejector used for cleaning the reactor cavity and the pressure vessel 10. Capsules containing guide tubes of the "aero-balls" system. 11. Capsules for samples of pressure-vessel steel subjected to irradiation 12. Nuclear-instrumentation plate

Table VI. Trino Power Plant--Summary of Radioactive-Wastes Situation

Tipo di rifiuto (1)	Provenienza (2)	Accumulo m³ (3)	Attività Ci/m³ (4)	Radionuclidi significativi (5)	Trattamento (6)	Condizionam. (7)	Deposito (8)	Produzione prevista m³/a (9)
LIQUIDI (10)								
acquose cat. 1 (11)	lavanderia - drenaggi (18)	0	10^{-6}	P.F.		-	-	3.000 - 4.000
acquose cat. 2 (12)	circuito primario (19)	0	10^{-6} - 10^{-1}	P.F. - P.A.	scambio ionico (23)	-	-	1.000 - 2.000
SOLIDI (13)								
comprimibili cat. 1 (14)	manutenzione e decontaminaz. reattore e laboratorio appoggio (20)	291*	< 10^{-3}	^{60}Co-^{137}Cs -^{134}Cs-^{54}Mn	pressatura (24) (Rid. di vol. 5 : 1) (25)	infustamento (26)	piazzale (28)	20 - 60*
Manufatti (15)		105	0.1 - 3	-		in calcestruzzo (27)	-	2 - 4
Solidi di grandi dimensioni cat. 1-2-3 (16)	vedi tab. V (21)							
Resine scambiatrici cat. 1-2-3 (17)	sistemi di purificazione del primario (22)	47	10^{-3} - 10	-			piscina e piazzale (29)	4

* Volume after packaging or processing.

Key:

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. Aqueous, category 1 12. Aqueous, category 2 13. Solids 14. compressible, category 1 15. Blocks 16. Large-dimension solids, categories 1-2-3 17. Exchanger resins, categories 1-2-3 18. scrubbing-drainage 19. primary circuit 20. maintenance and decontamination of reactor and support laboratory 21. see Table V 22. Primary-circuit purifaction systems 23. ion exchange 24. pressing 25. Reduction of volume 5:1 26. putting in drums 27. in concrete 28. yard 29. pool and yard

Accumulation: 47 m^3
Specific activity (^{60}Co - ^{137}Cs - ^{134}Cs - ^{90}Sr - ^{54}Mn): 10^{-2} - 10 Ci/m^3
Production: 4 m^3 per year

The data so far given are summarized schematically in Table VI.

3.2 Nuclear Electric Power Plant of Caorso

3.2.1. Compressible Solids, IAEA Category 1

These come from the ordinary and extraordinary maintenance operations. They are compacted in drums (volume reduction 5:1).

Accumulation: 12 m^3 = 60 drums (compacted)
Specific activity: 10^{-3} - 10^{-2} Ci/m^3 (PA-PF [expansions unknown])
Production: 10 m^3 per year = 50 drums per year (compacted)

3.2.2. Resins and Muds

These are the resins from the clean-up of the water of the cooling circuits and of the sedimentation muds of the tanks. These wastes are enclosed in urea-formaldehyde in 220-liter blocks and then stored in an appropriate shielded building.

Accumulation: 1,250 drums (328 of which are packed with urea-formaldehyde)
Activity: 0.02 - 1 Ci/drum (^{60}Co - ^{58}Co - PF)
Production: 500 blocks/year

The data given so far are summarized schematically in Table VII.

3.3. Nuclear Electric Power Plant of Latina

3.3.1. Aqueous Liquids, IAEA Category 2

These come from decontamination of components, from the active scrubbing, and from the drainages. These wastes are normally discharged into the sea without any processing beforehand.

Production: 450 m^3 per year
Specific activity: (^{137}Cs - ^{60}Co): 10^{-5} - 10^{-3} Ci/m^3

3.3.2. Compressible Combustible and Noncombustible Solids, IAEA Category 1

These come from the reactor maintenance and decontamination operations and from the running of the reactor support laboratories. These wastes are put in drums by pressing, which reduces their volume in the ratio of about 5:1. The drums containing the wastes are stored in a shed whose capacity is approaching exhaustion.

Table VII. Caorso Power Plant--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulo m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Trattamento	(7) Condizionam.	(8) Deposito	(9) Produzione prevista m³/a
SOLIDI (10) comprimibili cat IAEA 1 (11)	manutenzione (13)	12	10[illegible] - 10[illegible]	PA-PF	(15) pressatura (Rid. di vol. 5 : 1)	infustamento (17)	capannone (18)	10 *
Resine e fanghi (12)	clean - up sedimenti (14)	250	[illegible] - 1	PA-PF	inglobamento in Urea - Formaldeide (16)	—	edificio apposito (19)	100 *

* Volumes after packaging or processing.

Key:

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Solids 11. compressible, IAEA Category 1 12. Resins and muds 13. Maintenance 14. clean-up of sediments 15. pressing (volume reduction 5:1) 16. enclosing in urea-formaldehyde 17. putting in drums 18. shed 19. special building

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Accumulation: 110 m^3 (compacted) = 550 drums
Activity: (^{60}Co - PF): 1-5 mCi/drum
Production: 6-10 m^3 per year (compacted) = 50 drums

3.3.3. Incompressible Noncombustible Solids, IAEA Categories 2, 3

These are mainly steel samples put in shielded containers that are stored in the yard referred to in section 3.2.2.

Accumulation: 0.1 m^3
Total activity: (^{60}Co - ^{59}Fe): 1 Ci
Production: a few liters per year

Table VIII. Latina Power Plant--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulo m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Trattamento	(7) Condizionam.	(8) Deposito	(9) Produzione prevista m³/a
LIQUIDI (10)								
acquosi cat. 2 (11)	lavanderia, decontaminazione, drenaggi (19)	0	$10^{-[illegible]}$ - $10^{-[illegible]}$	^{137}Cs-^{60}Co	-	-	-	450
SOLIDI (12)								
combustibili e incombustibili compressibili cat. 1 (13)	manutenzione e decontaminazione (20)	110 *	0,015	^{60}Co-P.F.	(27) pressatura (rid. di vol. 5 : 1)	infustamento (28)	capannone (31)	6 - 10 *
incombustibili incompressibili cat. 2,3 (14)	gestione reattore (21)	0.1	1 Ci tot. (25)	^{60}Co-^{55}Fe	-	in contenitori schermati (29)	-	qualche litro/a (33)
incombustibili cat. 3 (15)	-	150	50 Ci tot. (25)	-	-	-	(32) in vasche di calcestruzzo interrate	10
filtri cat. 1 (16)	impianto di ventilazione (22)	5 - 6	non rilev. (26)	-	-	in sacchi di plastica (30)	capannone (31)	0.5
solidi di grandi dimensioni cat. 1 (17)	prove componenti e materiali vari (23)	100	-	-	-	-	(34) parte su piazzale all'aperto, parte in capannoni	-
fanghi (18)	evaporazione e sedimento (24)	70	20 Ci tot. (25)	-	-	-	(35) in serbatoio schermato	1 - 2

*Volumes after packaging or processing

Key:

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. Aqueous, catagory 2 12. Solids 13. compressible combustible and noncombustible, category 1 14. incompressible noncombustilbe, categories 2, 3 15. incombustible, category 3

[Key continued on following page]

[Key for Table VIII--continued]

16. filters, category 1 17. large-dimension solids, category 1 18. muds 19. scrubbing, decontamination, drainage 20. maintenance and decontamination 21. reactor management 22. ventilation plant 23. large components and various pieces of equipment 24. evaporation and sediments 25. total 26. not recorded 27. pressing (volume reduction 5:1) 28. putting in drums 29. in shielded containers 30. in plastic bags 31. shed 32. in concrete tanks, buried 33. a few liters per year 34. part in open yard, part in sheds 35. in shielded reservoir

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3.3.4. Noncombustible Solids, IAEA Category 3

This is material composed of cladding parts, fins, thermocouple heads, springs, ferrules, etc, stored in the storage pool called the "splitter pit," with a volume of about 170 m^3. No system for recovery of the stored material is provided for. The remaining holding capacity is about 2 years' worth.

Accumulation: 150 m^3
Total activity (^{60}Co - ^{59}Fe): 50 Ci
Production: 10 m^3 per year

3.3.5. Filters, IAEA Category 1

These come from the reactor building's ventilation plant; they are standard elements whose dimensions are 60 X 60 X 30 cm. They are put into plastic bags and stored in the shed referred to in section 3.3.2.

Accumulation: 5-6 m^3
Activity: not determinable
Production: 0.5 m^3 per year

3.3.6. Large-Dimension Solids, IAEA Category 1

These consist mainly of:

--4 preheaters, with dimensions of 15 m X Ø1.20 m, slightly contaminated (from the Garigliano Power Plant and stored in the open);

--10 empty metal tanks of 1.5 m^3 each;

--2 m^3 of metal tubes, with dimensions of 1.5 m X Ø0.20 m, 2 mm thick;

--3 m^3 of miscellaneous metal pieces;

--12 reinforced-concrete blocks of 4 m^3 each, in which contaminated materials are enclosed. Contact doses: less than 70 mR per hour.

3.3.7. Muds

These come from the running of the evaporator (now no longer used), from the cleaning of the bottom of the fuel-elements storage tank, and from the cleaning of the cyclones. They are stored in an open-air tank (housed in a

Table IX. Garigliano Power Plant--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulo m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Trattamento	(7) Condizionam.	(8) Deposito	(9) Produzione prevista m³/a
LIQUIDI (10)								
acquosi cat. 2 (11)	drenaggi-decont. (19)	–	$10^{-4} \div 10^{-3}$	^{60}Co-^{137}Cs	evaporazione (29)	–	–	3.000 ÷ 4.000
	lavanderia attiva (20)	–	$10^{-5} \div 10^{-4}$	–	–	–	–	500 ÷ 600
acquosi cat. 3 (12)	rigener. resine (21)	–	$10^{-5} \div 10^{-3}$	–	evaporazione (29)	–	–	600 ÷ 700
acquosi cat. 4 (13)	decontaminazione (22)	3	1 ÷ 10	–		–	serbatoio schermato (32)	0,5 ÷ 1 m³/a (36)
SOLIDI (14)								
comb. e incomb. comprimibili cat. 1 (15)	decontaminaz. manutenzione (23)	260	0,01 ÷ 0,1	^{60}Co-^{137}Cs ^{59}Fe-^{54}Mn	pressatura (rid. volume 5 ÷ 1) (30)	infustamento (31)	capannone (33)	40*
incombustibili cat. 3 (16)	gestione reattore (24)	7.2	24.000 Ci tot (28)	^{60}Co	–	–	in piscina (34)	0,03 ÷ 0,1
resine cat. 2-3 (17)	tratt. liquidi (25)	160	1 ÷ 10	^{60}Co-PF	–	–	in serbatoi schermati (35)	10
fanghi (18) cat. 1	trattamenti (26)	40	0,1 ÷ 0,5	–	–	–	–	10 ÷ 20
cat. 2	sedimenti (27)	30	5 ÷ 10	–	–	–	–	0,5 ÷ 2

*Volumes after packaging or processing.

Key:

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. aqueous, category 2 12. aqueous, category 3 13. aqueous, category 4 14. Solids 15. compressible combustible and noncombustible, category 1 16. noncombustible, category 3 17. resins, categories 2, 3 18. muds, category 2 19. drainage, decontamination 20. active scrubbing 21. regeneration of resins

[Key continued on following page]

[Key for Table IX--continued]

22. decontaimination 23. decontamination, maintenance 24. reactor management 25. processing of liquids 26. processing 27. sediments 28. total 29. evaporation 30. pressing (volume reduction 3:1) 31. putting in drums 32. shielded reservoir 33. shed 34. in pool 35. in shielded reservoirs 36. m^3 per year

---

half-buried shielded bunker) of 150 m^3 capacity, not provided with a system for recovery of the contents. It should be pointed out that mixed in with the muds are numerous broken plastic containers of 25-30 liters, exchanger resins, inorganic exchangers, and other solid materials of various kinds.

Accumulation: 70 m^3
Total activity: 20 Ci
Production: 1-2 m^3 per year

The data given so far are summarized in schematic form in Table VIII.

3.4. Nuclear Electric Power Plant of Garigliano

3.4.1. Aqueous Liquids, IAEA Category 2

These come from:

a) the floor drainage and the decontamination operations. They may be discharged directly to the outside (Garigliano River) or may be put through filtration or evaporation, depending on their radioactive content;

Specific activity (^{137}Cs - ^{60}Co):
10^{-4} - 10^{-3} Ci/m^3
Production: 3,000-4,000 m^3 per year

b) from the hot scrubbing; they are discharged directly to the outside;

Specific activity (^{137}Cs - ^{60}Co):
10^{-5} - 10^{-4} Ci/m^3
Production: 500-600 m^3 per year

3.4.2. Aqueous Liquids, IAEA Category 3

These come from regeneration of the resins. They are decontaminated by evaporation or are discharged directly to the outside, depending on their radioactive content.

Specific activity (^{137}Cs - ^{60}Co - ^{90}Sr):
10^{-3} - 10^{-2} Ci/m^3
Production: 500-600 m^3 per year

Table X. EUREX Plant--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulato m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Trattamento	(7) Condizionamento	(8) Deposito	(9) Produzione prevista m³/a
Liquidi (10)	(22)							
acquoso cat. 1 (11)	drenaggi ecc	–	[illegible]	PF	–	–	–	[illegible]
acquoso cat. 4 (12)	1° ciclo [illegible] trattamento (23)	88	2.9 [illegible] Ci/m³	PF	–	–	[illegible] (30)	7
acquoso cat. 4 (12)	2 ciclo [illegible] (24)	[illegible]	20 Ci/m³ (27)	PF	–	–	–	10 - 20
organico cat. 4 (13)	–	30	0.1 - 1	–	–	–	–	1.2
SOLIDI (14)								
comb. compr. cat. 1 (15)	[illegible] (25)	180	175 mCi/m³ (27)	PF, U	–	[illegible] (28)	[illegible] (31)	20
comb. compr. cat. 2 (16)	–	1.2	600 mCi/m³ (27)	–	–	–	–	2
incomb. incompr. cat. 1 (17)	–	52	100 mCi/m³ (27)	–	–	–	–	2
incomb. incompr. cat. 2 (18)	–	9	216 mCi/m³ (27)	–	–	–	–	2
[illegible] cat. 3-4 (19)	–	0	–	–	–	[illegible] (29)	–	10 *
filtri cat. 1-3 (20)	[illegible] (26)	84	21 mCi/m³ (27)	–	–		–	28 *
rifiuti di grandi (21) dimensioni cat. 4	–	190	–	–	–	–	–	–

*Volume after packaging or processing.

[Key on following page]

[Key for Table 8]

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. aqueous, category 1 12. aqueous, category 4 13. organic, category 4 14. Solids 15. compressible combustible, category 1 16. compressible combustible, category 2 17. incompressible noncombustible, category 1 18. incompressible noncombustible, category 2 19. noncombustible, categories 3, 4 20. filters, categories 1-3 21. large-dimension solids, category 4 22. drainage, etc 23. 1st-cycle reprocessing 24. 2nd-cycle reprocessing 25. running of plant 26. ventilation plant 27. total 28. putting in drums 29. enclosing in concrete 30. shielded reservoirs 31. part in shed, part in the open

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3.4.3. Aqueous Liquids, IAEA Category 4

These consist of decontaminated solutions that are stored in open-air tanks of 10 m^3 capacity located in the bunker referred to in section 3.4.9.

Accumulation: 3 m^3
Specific activity (^{137}Cs - ^{60}Co):
1-10 Ci/m^3
Production: 0.5-1 m^3 per year

3.4.4. Compressible Combustible and Noncombustible Solids, IAEA Category 1

These come from various decontamination operations. A good part of the wastes produced (~1,100 m^3) has been buried in filled-in trenches on site. At present, they are pressed into 200-liter drums (with volume reduction of 5:1) and stored in a new large-capacity shed that gives 6-7 years' capacity.

Accumulation: 260 m^3 (compacted) = 1,300 drums
Specific activity (^{60}Co - ^{137}Cs - ^{54}Mn - ^{59}Fe):
5 mCi/drum
Production: 40 m^3 per year (compacted) = 200 drums

3.4.5. Noncombustible Solids, IAEA Category 3

These consist of irradiated materials from the inside of the reactor channels, tapes, etc), put into a small pool (not provided with a recovery system).

Accumulation: 7.2 m^3
Total activity (^{60}Co): 24,000 Ci
Production: 30-100 liters per year

3.4.6. Large-Dimension Solids, IAEA Category 1

To date, four preheaters (1.15 m X Ø1.20 m) have been produced as wastes, slightly contaminated; they are stored on the Latina power-plant site. It

Table XI. CCR-EURATOM, Ispra--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulo m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Trattamento	(7) Condizionamento	(8) Deposito	(9) Produzione prevista m³/a
LIQUIDI (10)								
acquosi cat. 2-3 (11)	attività varie di ricerca lavanderia (17)	0	[illegible]	P.F.	chimico (20)		–	2.500
organici cat. 2 (12)		0	[illegible]	–	–	–	–	alcuni litri (26)
SOLIDI (13)								
solidi compr. comb. cat. 1 (14)	attività varie di ricerca (18)	0	–	P.F., P.A., U, Th	pressatura (rid. volume 5:1) (21)	bitumatura (27)	interramento in trincee (23)	[illegible] *
incomb. incompressibili cat. 1-2 (15)	–	[illegible] *	–	–	–	inglobamento in calcestruzzo (22)	piazzale (24)	[illegible] *
incomb. incompressibili cat. 3 (16)	–	0	(19) parecchie centinaia totali	–	–	–	(25) inglobamento in calcestruzzo in pozzi interrati	–

* Volumes after packaging or processing.

Key:

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. aqueous, categories 2, 3 12. organic, category 2 13. Solids 14. compressible combustible, category 1 15. incompressible noncombustible, categories 1, 2 16. incompressible noncombustible, category 3 17. various research activities, scrubbing 18. various research activities 19. a few hundred total 20. chemical 21. pressing (volume reduction 5:1) 22. enclosing in concrete 23. burying in trenches 24. yard 25. inclosing in concrete in buried-in shafts 26. a few liters 27. bitumination

Table XII. CSN, Casaccia--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulato m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Scarico	(7) Condizionamento	(8) Deposito	(9) Produzione prevista m³/a
[illegible] (10)								
[illegible] (11)	[illegible] (23)	[illegible]	[illegible]	P.F. U, Th	[illegible] (34)			150 - 250
[illegible] (12)	[illegible] (24)	8	[illegible]	^{239}Pu, ^{241}Am	—	[illegible] (35)	[illegible] (31)	[illegible]
[illegible] (13)	[illegible] (25)	[illegible]	[illegible]	P.F. [illegible]	—	[illegible] (36)	—	[illegible]
[illegible] (14)								
[illegible] (15)		[illegible]	[illegible]	P.F., P.A. U, Th		[illegible] (37)	—	30 - 50
[illegible] (16)	[illegible] (26)	[illegible]	[illegible]	^{239}Pu, ^{241}Am		[illegible] (37)	—	20 - 30
[illegible] (17)	[illegible] (27)	[illegible] (32)	—	P.F.	—	[illegible] (38)	—	—
[illegible] (18)	[illegible] (28)	[illegible]	[illegible]	P.F., U, Th	—	[illegible] (39)	—	4 - 8 *
[illegible] (19)	[illegible] (29)	[illegible]	[illegible] (33)	P.F., P.A.		[illegible] (40)	—	7 - 10
[illegible] (20)	—	22	—	Pu		—	—	[illegible]
[illegible] (21)	(30) [illegible]	200	[illegible] (33)	P.F. Pu			[illegible] (31)	[illegible]
[illegible] (22)	[illegible] (30)	20	—	^{239}Pu, ^{241}Am	—	(41) [illegible]	[illegible] (31)	[illegible]

* Volumes after packaging or processing

[Key on following page]

[Key for Table XII]

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. aqueous, category 2 12. aqueous containing transuranic elements, category 3 13. organic, category 2 14. Solids 15. combustible and noncombustible, category 1 16. combustible and noncombustible, category 4 17. compressible combustible and noncombustible, category 3 18. muds, category 1 19. filters, category 1 20. filters containing transuranic elements, category 4 21. large-dimension solids, category 1 22. large-dimension solids, category 4 23. various research activities, scrubbing 24. plutonium plant 25. various research activities 26. Pu plant 27. post-irradiation examinations 28. processing of liquids 29. ventilation plant 30. dismantling of plant and laboratories 31. shed 32. cans 33. negligible 34. chemical 35. putting the collection containers in drums 36. absorption in sawdust and putting in drums 37. putting in drums 38. shielded containers 39. enclosing in concrete 40. in plastic bags 41. in metal containers in pools

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is presumed that other large components of the same type will be discarded as wastes in the coming years.

3.4.7. Resins, IAEA Categories 2, 3

The exchanger resins come from the processing of the primary-circuit water, from the processing of the condensate, and from the processing of the low saline-content drainwaters; they are stored in two reservoirs--one of 90 m^3 capacity, now filled, and one of 150 m^3 capacity, open to the air--housed in a buried bunker that does not have a specific system for recovery of the contents. These resins have a semifluid consistency, because of the presence of abundant water.

Accumulation: 160 m^3
Specific activity (^{60}Co - PF): 1-10 Ci/m^3
Production: 10 m^3 per year

3.4.8. Muds, IAEA Category 1

These come from the evaporator for treatment of the resin-regenerator solutions (processing capacity, 700 liters/hour); these muds are stored in a 40-m^3 open-air reservoir housed in the bunker referred to in section 3.4.7.

Accumulation: 40 m^3
Specific activity (^{60}Co - ^{137}Cs): 0.1-0.5 Ci/m^3
Production: 10-20 m^3 per year

3.4.9 Muds, IAEA Category 2

These come from the preprocessing filters at the ionic exchange for the fuel-elements storage-pool water; these muds are stored in an open-air reservoir of 190 m^3, housed in the bunker referred to in section 3.4.7.

Accumulation: 30 m^3
Specific activity (^{60}Co): 5-10 Ci/m^3
Production: 0.5-2 m^3 per year

The data given so far are summarized in schematic form in Table IX.

3.5. SORIN Center, Saluggia

3.5.1. Solids, IAEA Category 1

These are solid wastes of various kinds (paper, plastic, glass, metal pieces, etc) that are put into 220-liter drums and stored partly in the open and partly under cover. Once it has decayed, the material contaminated by radionuclides of short half-life is dumped as conventional refuse (reducing the accumulation).

Accumulation: 150 m^3
Specific activity (PF, PA, etc): a few mCi/m^3
Production: 50 m^3 per year

3.5.2. Solids, IAEA Category 3

These are wastes deriving from metallurgy experiments and consist essentially of paper, rags, small pieces of equipment, small rods of spent UO_2, irradiated metal materials and sources, etc. Part of these wastes are put into appropriately shielded 220-liter drums, and part into small concrete shafts (boreholes) set in a small building equipped with a hoist.

Accumulation: 0.6 m^3
Activity (PF, ^{60}Co - PA): 475 Ci total
Production: --

3.6. EUREX Installation, Saluggia

3.6.1. Aqueous Liquids, IAEA Category 1

These wastes come from various operations, drainage, etc; they are collected, through direct pipelines, into two concrete tanks, so that they can be monitored before discharge into the Dora River.

Specific activity (PF): 10^{-5} Ci/m^3
Production (variable in function of
work activity): 7,000-120,000 m^3 per year

3.6.2. Aqueous Liquids Containing Transuranic Elements, IAEA Category 4

These fall into two groups:

a) liquids coming from the second cycle of extraction with solvent. They are collected in a set of reservoirs, housed in a shielded bunker, consisting of six stainless-steel reservoirs of 50 m^3 each, two of which function as a s [illegible] eserve.

Solidification of such wastes in bituminous blocks is provided for.

Accumulation: 75 m^3
Total activity (PF): 20 Ci
Production: 10-20 m^3 per year

b) liquids coming from the first solvent-extraction cycle. These are collected in a set of reservoirs housed in the same bunker as referred to in the preceding section and consisting of five stainless-steel reservoirs of 50 m^3 each, one of which functions as a safety reserve.

Accumulation: 88 m^3
Total activity (PF): 250,000 Ci
Production: 7 m^3 per year

3.6.3. Organic Liquids Containing Transuranic Elements, IAEA Category 4

Accumulation: 31 m^3
Specific activity: 0.1-1 Ci/m^3
Production: 1.5 m^3 per year

3.6.4. Compressible Combustible Solids, IAEA Category 1

These come from the running of the plant and the support laboratories. These wastes are put into 220-liter drums which in turn are stored, part in an industrial-type shed and part in the open.

Accumulation: 180 m^3
Total activity (PF, U): 175 mCi
Production: 26 m^3 per year

3.6.5. Compressible Combustible Solids, IAEA Category 2

These come from the running of the plant and the support laboratories. These wastes are put into 220-liter drums which in turn are stored, part in an industrial-type shed and part in the open.

Accumulation: 1.2 m^3
Total activity (PF, U): 600 mCi
Production: 2 m^3 per year

3.6.6. Incompressible Noncombustible Solids, IAEA Category 1

These come from the running of the plant and from the support laboratories, and consist essentially of metal pieces and glass. These wastes are put into 220-liter drums which in turn are stored in the same way as the drums referred to in the preceding section (3.5.4.).

Accumulation: 52 m^3
Total activity (PF, U): 100 mCi
Production: 2 m^3 per year

Table XIII. CRN, Trisaia--Summary of Radioactive Wastes Situation

(1) Tipo di rifiuto	(2) Provenienza	(3) Accumulo m³	(4) Attività Ci/m³	(5) Radionuclidi significativi	(6) Trattam.	(7) Condizionam.	(8) Deposito	(9) Produzione prevista m³/a
LIQUIDI (10)								
acquosi cat. 2 (11)	drenaggi, lavaggi (18)	0	$10^{-5} - 10^{-4}$	P.F.	-	-	smaltimento in mare (22)	150-300
acquosi cat. 4 (12)	riprocessamento (19)	20	0.5 - 5	P.F.	-	-	in serbatoi (23)	9
acquosi cat. 5 (13)		4	10^{2}	P.F.	-	-		0.75
SOLIDI (14)								
combustibili compressibili cat. 1 (15)	operazioni varie (20)	0	$< 10^{-3}$	P.F.	-	in sacchi di plastica e/o infustamento (21)	smaltimento in trincea (24)	60 - 120
incombustibili compressibili cat. 1 (16)	-	0	$< 10^{-3}$	P.F.	-	-	-	20 - 40
incombustibili incompressibili cat. 2-3 (17)	-	0	600 - 700	P.F.	-	-	inglobamento in calcestruzzo entro pozzi interrati (25)	0.4

Key:

1. Type of waste 2. Source 3. Accumulation 4. Activity 5. Significant radionuclides 6. Processing 7. Packaging 8. Storage 9. Production forecast 10. Liquids 11. aqueous, category 2 12. aqueous, category 4 13. aqueous, category 5 14. Solids 15. compressible combustible, category 1 16. compressible noncombustible, category 1 17. incompressible noncombustible, categories 2, 3 18. drainage, scrubbing 19. reprocessing 20. various operations 21. in plastic bags and or in drums 22. dumping in the sea 23. in reservoirs 24. dumping in trenches 25. enclosing in concrete inside buried-in shafts

General Summary of the Quantities of Wastes Lying on National Soil and of Production Forecast for the Short Term, for Low to Medium Beta-Gamma Activity Only

Solidi di bassa attività (1)				Resine (2)		Fanghi (3)		Manufatti (4)	
Accumulo n° di fusti (5)		Produzione n° di fusti (6)		(7) Accumulo	(8) Produzione	(7) Accumulo	(8) Produzione	(7) Accumulo	(8) Produzione
non compatt. (9)	compatt. (10)	non compatt. (9)	compatt. (10)	m³	m³/a	m³/a	m³/a		
9.250	1.850	1.000	200	4*	4	–	–	(11) 213 da 200 l 62 da 1 m³	(11) 15 da 200 l
2.700	550	250	50	—	—	70	1	12 da 4 m³	–
6.500	1.300	1.600	200	160	10	70	20	—	
500	60	250	50	—	—	—	—	1200 da 200 l	500 da 200 l
1.200	—	150	–	—	—	—	–	–	–
5.000	—	300	–	—	—	–	–	500 da 200 l	20 da 250 l
0	—	500	–	—	–	–	—	–	–
			–	–	–	–	—	460 m³	500 da 200 l 20 da 2.7 m³
—	—				–	—	—	300 da 1 m³	20 da 1 m³
—	–	100	–	–	–	–	–	–	—

Key:

1. Low-activity solids 2. Resins 3. Muds 4. Blocks 5. Accumulation--number of drums 6. Production--number of drums 7. Accumulation 8. Production 9. not compacted 10. compacted 11. [da]: of (the size of)

3.6.7. Incompressible Noncombustible Solids, IAEA Category 2

These come from the running of the plant and the support laboratories and consist essentially of metal pieces and glass. These wastes are put into 220-liter drums which in turn are stored like the drums referred to in the preceding section (3.5.4.).

Accumulation: 9 m^3
Total activity (PF, U): 216 mCi
Production: 2 m^3 per year

3.6.8. Noncombustible Solids, IAEA Categories 3, 4

These are fuel-element casings. These wastes are not being produced yet; production of them is expected in the period 1979-1981. Packaging of them in concrete, in cylindrical steel containers of 3 m^3 each, is planned.

3.6.9. Filters, IAEA Categories 1-3

These come from the air-filtration plant for ventilation of the cells and of the laboratories. Once these filters--which are assembled in sets of 12 in a box--are exhausted, they are extracted with the whole carrier-box, put in an airtight plastic case, and then put into a 12-m^3 reinforced-concrete box.

Accumulation: 84 m^3
Total activity (PF, U): 21 mCi
Production: 24 m^3 per year

3.6.10. Large-Dimension Solids, IAEA Category 4

These are various plant components contaminated by low-level natural uranium, and they are contained in a series of 12-m^3 reinforced-concrete tanks.

Accumulation: 150 m^3

The data given so far are summarized in schematic form in Table X.

3.7. CCR-EURATOM, Ispra

3.7.1. Aqueous Liquids, IAEA Categories 2, 3

These come from various research activities, from the hot scrubbing, etc. They are subjected to decontamination by chemical processing and then discharged into the outside environment.

Specific activity: 10^{-6} - 10^{-2} Ci/m^3
Production: 2,500 m^3 per year

3.7.2. Organic Liquids, IAEA Category 2

These come from various research activities and are burned in a special burner.

Specific activity: 10^{-4} Ci/m^3
Production: negligible

3.7.3. Compressible Combustible Solids, IAEA Category 1

These come from various research activities. They are collected in standard small steel-plate drums, Ø30 cm X h 70 cm, which are subjected to pressing which reduces the volume by 5:1. The slabs resulting from the pressing are enclosed in bituminous blocks together with the muds resulting from processing of the liquids. The blocks produced are buried in appropriate trenches which provide a capacity of several years. To date, 3,800 200-liter blocks have been buried.

Accumulation: zero
Activity (PF, PA, U, Th): --
Production: 100-125 m^3 per year
(= 500-600 blocks per year)

3.7.4. Incompressible Noncombustible Solids, IAEA Categories 1, 2

These wastes are enclosed directly in prefabricated reinforced-cement blocks with standard outside dimensions of 1.4 X 1.4 X 1.4 m, the usable inside volume of which varies with the shielding required, to ensure an outside-surface contact dose of $\leqslant$ 200 mR/hour, and/or the dimensions of the wastes to be enclosed. Average weight: 5.5 tons.

The blocks are stored in a yard big enough to provide several years' capacity.

Accumulation: 460 m^3 = 170 blocks
Activity: --
Production: 50-80 m^3 per year =
20-30 blocks per year

3.7.5. Incompressible Noncombustible Solids, IAEA Category 3

These are irradiated parts from the reactor. They are put into cement shafts in the ground which are filled with poured cement. To date, 65 m^3 of shafts have been filled.

Accumulation: zero
Activity: a few hundred Ci
Production: --

3.7.6. Muds, IAEA Category 1

These come from the processing of the aqueous liquids of IAEA Category 2 and are enclosed in bituminous blocks together with the slabs resulting from the processing of the compressible combustible solid wastes of IAEA Category 1.

The data given so far are summarized in schematic form in Table XI.

3.8. CAMEN, Pisa

A single type of waste is produced at the CAMEN, consisting of concrete blocks whose dimensions are Ø80 cm by h 115 cm, weighing about 1,500 kg on the average. In these blocks are enclosed the solid wastes, after pressing (volume reduction, 4:1), and the concentrates from the evaporation and the chemical processing of the liquid wastes of categories 1 and 2.

These blocks are stored in a 2,500-m^2 yard composed of a concrete bed, equipped with rainwater drains, that gives a capacity of several years.

Accumulation: 388 blocks
Intensity of contact exposure: <200 mR/hour
Production: 20-25 blocks per year

3.9. CSN, Casaccia

3.9.1. Aqueous Liquids, IAEA Category 2

These come from various research activities, from the active scrubbing, etc. They are subjected to decontamination by chemical processing and are then discharged into the outside environment.

Specific activity (PF, U, Th, etc):
10^{-5} - 10^{-4} Ci/m^3
Production: 150 - 250 m^3 per year

3.9.2. Aqueous Liquids Containing Transuranic Elements, IAEA Category 3

These come from activities related to production of fuel elements containing plutonium. These liquids, collected in 25-liter PVC bottles, are packed into 220-liter drums with layers of absorbent material between them. The drums are then stored in industrial sheds.

Accumulation: 8 m^3
Specific activity (^{230}Pu, ^{241}Pu, ^{241}Am):
10^{-5} - 10^{-2} Ci/m^3
Production: 0.1-o.5 m^3 per year

3.9.3. Organic Liquids, IAEA Category 2

These come from various research activities. They are transformed into compressible combustible solid wastes of IAEA Category 1 by absorption into wood sawdust.

Production: 2 m^3 per year

3.9.4. Combustible and Noncombustible Solids, IAEA Category 1

These come from various research activities. These wastes are collected in small plastic bags and the put into 220-liter drums, which are in turn stored in the same sheds as referred to in section 3.9.2.

Accumulation: 3,400 drums
Specific activity (PF, PA, U, Th):
$<10^{-4}$ Ci/m^3
Production: 30-50 m^3 per year

3.9.5. Compressible Combustible Solids Containing Transuranic Elements, IAEA Category 4

These come from activities related to production of plutonium fuel elements. These wastes, enclosed in PVC sacks, are put directly into 220-liter drums if they have low Pu content, and if they have higher Pu content, they are first put into tight metal boxes. The drums are then stored in the same sheds as referred to in section 3.9.2.

Accumulation: 1,400 drums
Specific activity (^{239}Pu, ^{241}Pu, ^{241}Am):
10^{-5} - 10^{-2} Ci/m^3
Production: 20-30 m^3 per year

3.9.6. Compressible Combustible and Noncombustible Solids, IAEA Category 3

These come from activities related to post-irradiation examination of fuel elements. These wastes are collected in 5-liter tin cans which are then inserted into small shielding tanks which are stored in the sheds referred to in section 3.9.2. At present, they are not being produced.

Accumulation: 80 cans
Activity: --
Production: --

3.9.7. Muds, IAEA Category 1

These come from the processing of liquids referred to in section 3.9.1., and are insolubilized in 220-liter cement blocks.

Accumulation: 460 blocks
Specific activity (PF, U, Th): 10^{-3} Ci/m^3
Production: 20-40 blocks per year

3.9.8. Filters, IAEA Category 1

These come from ventilation plants for laboratories, reactors, hot cells.

Accumulation: 80 m^3
Activity: negligible
Production: 5-10 m^3 per year

3.9.9. Filters Containing Transuranic Elements, IAEA Category 4

These come from the plutonium plant.

Accumulation: 22 m^3
Activity: negligible
Production: 2-5 m^3 per year

3.9.10. Large-Dimension Solids, IAEA Category 1

These consist of various components coming from laboratory and experimental-installation dismantling. Such wastes are stored in the sheds referred to in section 3.9.2.

Accumulation: 200 m^3
Activity: negligible
Production: 2-5 m^3 per year

3.9.11. Large-Dimension Solids Containing Transuranic Elements, IAEA Category 4

These are glove-boxes, parts of them, and plant parts from the plutonium plant.

Accumulation: 20 m^3
Production: ≈2 m^3 per year

The data given so far are summarized schematically in Table XII.

3.10. CRN, Trisaia

3.10.1. Aqueous Liquids, IAEA Category 2

These come from various drainages, decontamination operations, etc. They are collected in three concrete tanks that permit monitoring of them for discharge into the Ionian Sea in accordance with the norms.

Activity (PF): 10^{-5} - 10^{-4} Ci/m^3
Production: 100,000 m^3 per year

3.10.2. Aqueous Liquids, IAEA Category 4

For now, no processing is provided for these wastes--only storage. Depending on their acidity, they are sent into either two carbon-steel reservoirs of 68 m^3 each or two stainless-steel reservoirs of 68 m^3 each.

Accumulation: 20 m^3
Specific activity (PF): 0.5-5 Ci/m^3
Production: 18 m^3 per year

3.10.3. Aqueous Liquids, IAEA Category 5

As with the category-4 liquids, only storage is provided for these liquids. They are sent into two stainless-steel reservoirs with a capacity of 9.5 m^3 each.

Accumulation: 4 m^3
Estimated activity (PF): ≈10^5 [as published] Ci/m^3
Production: 0.75 m^3 per year

3.10.4. Compressible Combustible Solids, IAEA Category 1

These come from research activities relative to reprocessing of nuclear fuel. They are collected in plastic bags and put into 220-liter sheet-steel drums, which are then buried in a trench. To date, 520 m^3 has been buried.

Accumulation: zero
Specific activity (PF): $<10^{-4}$ Ci/m^3
Production: 100 m^3 per year

3.10.5. Compressible Noncombustible Solids, IAEA Category 1

These come from research activities related to reprocessing of nuclear fuel. They are collected in plastic bags and put into 220-liter sheet-steel drums, which are then buried in a trench. To date, 100 m^3 has been buried.

Accumulation: zero
Specific activity (PF): $<10^{-4}$ Ci/m^3
Production: 20-40 m^3 per year

3.10.6. Incompressible Noncombustible Solids, IAEA Categories 2, 3

These are small plant components that are set in concrete in buried shafts. To date, 3.2 m^3 of such wastes has been disposed of.

Accumulation: zero
Specific activity (PF): 600-700 Ci/m^3
Production: 0.4 m^3 per year

The data given so far are summarized in schematic form in Table XIII.

3.11. Users of Radioisotopes

As regards the users of radioisotopes, an inquiry among a sampling of them has shown that the users of unsealed sources--on the level of some mCi per year--each represent a wastes-production potential on the order of 0.5 to 5 m^3 per year. Such wastes consist essentially of:

--compressible combustible solids, IAEA Category 1;

--compressible noncombustible solids, IAEA Category 1.

The contaminated radionuclides have short half-lives for the most part, especially in the medical field.

3.12. Summary

Table XIV gives the cumulative data relative to solid radioactive wastes of low and medium activity lying on national soil through 1978, and the production forecast for the short term (3-4 years).

Table XIV.

	Production Centers
ENEL Power Plants	Trino Latina Garigliano Caorso
CNEN Centers	EUREX Casaccia Trisaia
Others	Ispra CAMEN Small producers

4. Inventory of Existing Facilities for Management of Radioactive Wastes

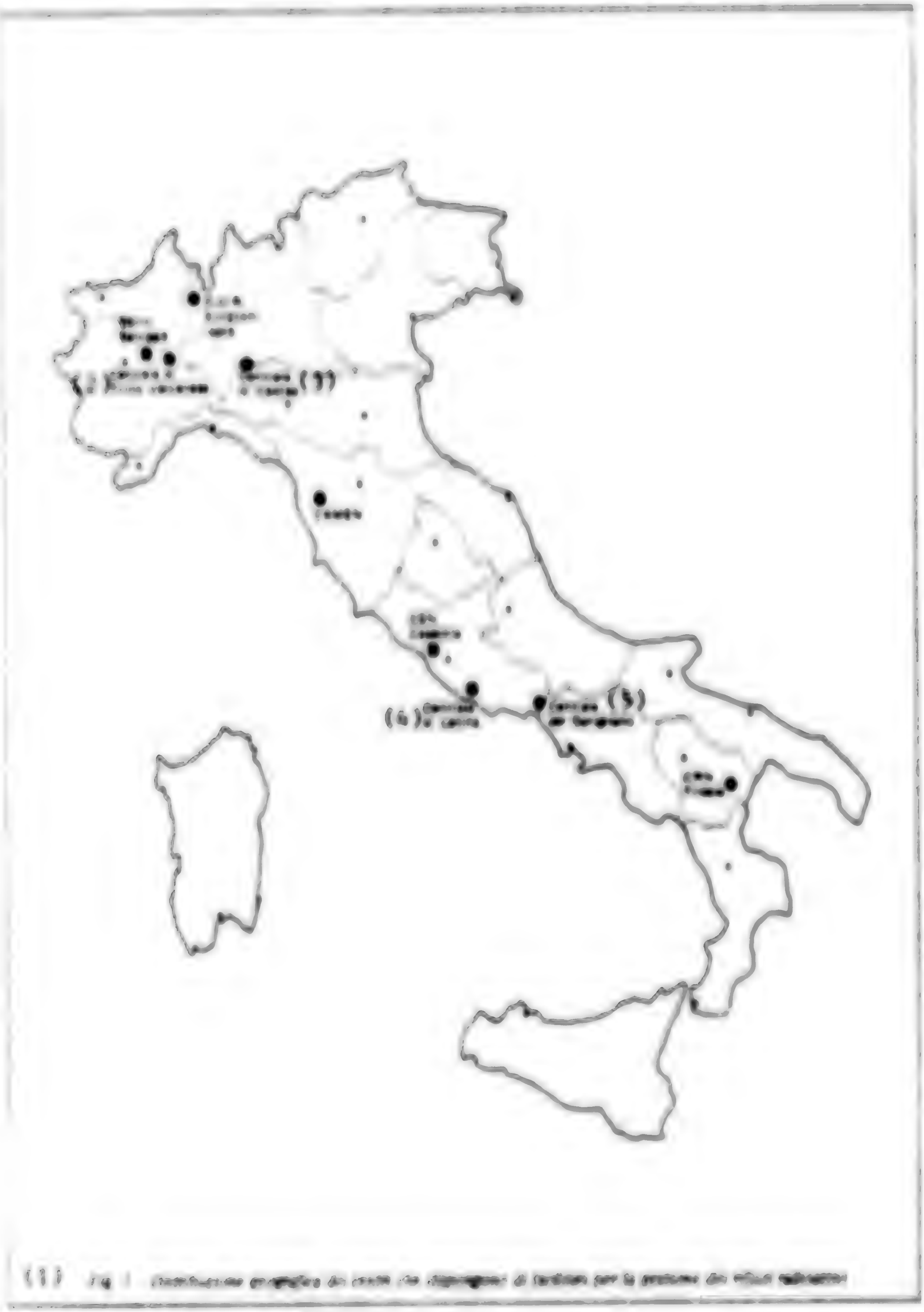
The Italian centers that have equipment of a certain magnitude for management of radioactive wastes are listed in Table XV, while their location on Italian territory is shown in Figure 3.

Table XV. General List of the Centers That Have Facilities for Management of Radioactive Wastes

Nuclear Electric Power Plant of Trino - ENEL
Nuclear Electric Power Plant of Latina - ENEL
Nuclear Electric Power Plant of Garigliano - ENEL
Nuclear Electric Power Plant of Caorso - ENEL
SORIN Center, Saluggia
CCR-EURATOM, Ispra
CAMEN, Pisa
CSN, Casaccia - CNEN
CRN, Trisaia - CNEN

Examination of the equipment in operation at the centers listed in Table XV showed that some equipment--especially that related to the nuclear electric power plants and that related to the industrial installations--is closely connected with the plants themselves and forms an integral part of them; thus it can be used exclusively for processing of the wastes produced at the plants in question.

In the present state of affairs, therefore, the centers that have organization and facilities for processing and packaging of radioactive wastes capable of handling eventual requests from other nuclear operators are:



Key:

1. Figure 3--Geographical distribution of the centers that have facilities for management of radioactive wastes 2. Trino Vercellese Power Plant 3. Caorso Power Plant 4. Latina Power Plant 5. Garigliano Power Plant

--the SORIN Center, Saluggia
--the CCR-EURATOM, Ispra
--the CAMEN-Pisa
--the CSN, Casaccia
--the CRN, Trisaia

In the following paragraphs, the existing facilities at these centers are examined briefly.

4.1. SORIN Center, Saluggia

4.1.1. Collection and Transport

Four van-type vehicles (FIAT 238 type) fitted out for transport of radoactive materials are available.

4.1.2. Storage

The following facilities are available for storage of radioactive wastes:

--a shed of about 70 m^2;

--a building of about 20 m^2 in whose floor a series of holes has been dug (depth about 60 cm, diameter about 20 cm), fitted with shielding plugs. The building is equipped with a hoist that runs on a monorail, for handling the hole plugs and any transportation shielding;

--four holding tanks of 50 m^3 each, for liquids of IAEA Categories 1-2.

4.1.3. Processing

A furnace fitted out especially for incineration of guinea pigs was purchased recently; it is not yet in operation.

4.2. CCR-EURATOM, Ispra

4.2.1. Collection and Transport

Various automotive vehicles for transport of solid and liquid wastes, and qualified for road transport also, are available.

4.2.2. Processing

The following equipment is in operation:

--a press for solid wastes of IAEA Category 1 (compacting force ≈50 tons), piston Ø30 cm, with adjoining dismantling and sorting room;

--an asphalter for muds and slabs from the pressing;

--a chamber equipped for handling solid wastes of IAEA Categories 2-3, containing a press (20-30 tons), a power hand, a transfer system for "La Calhene" cans and "Padirac" containers, and a semiautomatic system for transport of the processed materials to the section where insolubilization in concrete is done;

--a combustion plant for organic liquids, with combustion capacity of 25 liters per hour;

--a flocculation plant adjoined by two holding tanks of 200 m^3 each, for processing of liquids of IAEA Category 2 (processing cpaacity of 2.5 m^3 per hour, FD [expansion unknown] = 10-100);

--a plant for processing of liquids of IAEA Category 2 by means of exchanger resins (capacity, 2.5 m^3 per hour);

--a submerged-combustion evaporator.

4.2.3. Storage and Disposal

For storage of radioactive wastes, there are:

--two holding tanks of 200 liters each, shielded and buried, with a system for transfer by means of cendrillon for liquids of IAEA Categories 4-5, including those contaminated by transuranic elements;

--an underground tank (8.5 m X 4 m X 6 m), served by a bridge crane;

--about 15 buried concrete shafts (6 m deep, Ø1.5-2 m, some of them full), for highly active wastes;

--40 buried shafts (cooling shafts)--Ø0.40 m, depth 5.5 m--served by a bridge crane (30 tons) and fitted for introduction or extraction of materials by means of special hampers that can be hooked onto automatically. At present, these shafts are empty;

--a yard (6,000 m^2) designed for storage of cement blocks;

--a large area (2,000-5,000 m^2) for making trenches for burial of the bituminous blocks.

4.3. CAMEN-Pisa

4.3.1. Collection and Transport

The following are available:

--one 5-m^3 tank truck for liquids with specific activity of $<10^{-2}$ Ci/m^3;

--two electric forklifts for transporting various containers within the center:

- one 3-ton forklift
- one 2-ton forklift;

--one reservoir group consisting of five reservoirs of 18 m^3 each for collection of liquids with concentration of $\leq 10^{-2}$ Ci/m^3.

4.3.2. Processing and Packaging

The following are in operation:

--one evaporating that functions under vacuum. Operating flow: 60-70 liters per hour. Decontamination factor: $10^2 - 10^3$;

--one 20-ton oleodynamic press with automatic operating cycle and controlled ventilation; presses the material in bulk in concrete containers with characteristics equal to those of the blocks;

--one chemical-processing plant with two static reactors; processing capacity, 0.5-1 m^3 per day; filtration of muds with throwaway filters;

--one plant for enclosing muds and solid materials in concrete.

4.3.3. Storage

--one yard (~2,500 m^2), designed for storage of cement blocks.

4.4. CSN, Casaccia - CNEN

4.4.1. Collection and Transport

--a tank truck qualified for road transport of aqueous liquid wastes of IAEA Categories 1-2-3, with capacity of 5 m^3;

--a semitrailer tank truck for transport, within the center, of aqueous liquid wastes of IAEA Categories 1-2-3, with capacity of 5 m^3;

--a FIAT model 1100 TN truck for transport, within the Center, of solid wastes of IAEA Category 1;

--an OM [expansion unknown] forklift, model DIM 25, fitted for handling oil-type drums and other loads up to 2.5 tons (at the heel of the forks) and maximum height of 5 m;

--various items of equipment.

4.4.2. Storage

For storage of radioactive wastes, there are:

--an installation for storage of high-activity liquid wastes consisting of three holding tanks (700, 500 and 200 liters), housed in a shielded bunker and equipped with all the necessary transfer and control systems;

--two industrial sheds, each with surface area of 650 m^2 and usable height of 7 meters, designed for storage of solid wastes of IAEA Categories 1-4.

4.4.3. Processing

The CSN-Casaccia has:

--a plant for processing of aqueous liquid wastes of IAEA Categories 2-3. It is articulated in various sections, connected with one another but substantially autonomous. One of these sections is for decontamination, by chemical and chemical-physical processes, of aqueous liquid wastes with specific activity $\leqslant 10^{-3}$ Ci/m^3; processing capacity, 2.5 m^3 per hour. Another is for decontamination, through evaporation by thermocompression, of the liquid wastes with specific activity of 10^{-3} - 10^{-1} Ci/m^3; processing capacity, 350 liters per hour (FD $\leqslant 10^5$). Another is for reduction of the volume of the end-products of the chemical processing;

--a plant for incineration of combustible solid wastes of IAEA Category 1, with processing capacity of about 20 kg per hour.

A pressing and concrete-encasing plant is being built for processing and packaging of low-activity solids.

4.4. CRN, Trisaia

4.4.1. Collection and Transport

The following facilities have been built:

--three concrete tanks for collection of liquids of IAEA Categories 1-2;

--a reinforced-concrete building in which are housed:

- two carbon-steel holding tanks of 68 m^3 each, for neutral liquids of IAEA Categories 2-3-4;
- two stainless-steel holding tanks of 68 m^3 each for acid liquids of IAEA Categories 2-3-4;
- two stainless-steel tanks, with capacity of 9.5 m^3 each, for liquids of IAEA Category 5;

--a shielded vehicle appropriately fitted for on-site transport of solid wastes of IAEA Categories 2-3.

4.4.2. Disposal

The following have been provided for on-site disposal:

--a trench for burial of solid wastes of IAEA Category 1;

--several buried shafts with waterproofed concrete walls, for wastes of IAEA Categories 2-3.

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ITALY

NUCLEAR SAFETY COMMITTEE REVIEWS RECOMMENDATIONS AFTER VENICE CONFERENCE

Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian Jun 80 pp 39-43

[Recommendations forwarded to the minister of Industry, Senator Antonio Bisaglia, with a letter from the Committee chairman, Prof Carlo Salvetti, on 3 April 1980]

[Text] After careful examination during an evaluation of the speeches and discussions that took place during the Venice Conference (25-17 January 1980), the Consultative Committee for Nuclear Safety is of the opinion that no factors or data came out that will invalidate the report itself. The committee points out particularly that the technical conclusions of the conference have been treated by Prof Amaldi. The committee fully subscribes to those conclusions insofar as its specific mandate is concerned.

The committee, which was unable to express a majority opinion on the minority opinion accompanying the closing report of the conference's work, is of the opinion that it should not modify its own conclusions as a result of a careful examination of the minority arguments. It is of the opinion, at any rate, that the technical agencies appointed institutionally are in a position to provide adequate arguments to the specific objections. It points out that the speech by committee member Nebbia in the Venice Conference sufficiently specified the limits of difference of opinion, pointing out correctly the arguments of convergence also contained in the minority report.

The committee has noted with pleasure the almost unanimous consensus expressed in Venice on the recommendations of the report and especially on those final recommendations contained in chapter 10 and it is hoped that these guidelines will be implemented in practice.

The committee is of the opinion, in its evaluation of the Venice Conference, that it should offer a comment on the following points:

A. Information

The Venice Conference also contributed to demonstrating that, with regard to so-called "high risk" plants (actually with possible but not very probable catastrophic consequences, as was pointed out in one of the speeches), evaluation of the technical factors of the problem contributes only in part to the production of operational decisions. Moreover, the committee could not and should not intervene directly in calculating the costs/benefits ratio, although, actually, some of its conclusions may be interpreted as an estimate of economic and social "costs" pertaining to the risk aspect. In addition, of course, the formulation of majority and minority opinions on some issues and situations examined is an expression of differences affecting the technical aspect only partially. Moreover, the same chapter 10 of the report, signed by the entire committee, is based essentially on evaluations of credibility of the present institutional situation.

Therefore, the committee believes that it should call attention to the fact that its conclusions cannot form a complete basis for decisions regarding the choices to be made, because its task is limited to technical checks and guidelines on safety and inspections. Therefore, on the basis of this specific limitation, the committee believes that it should insist that the mechanisms of forming and informing public opinion must be suitable to the problem. Doubts on the present situation already expressed in the report were intensified in Venice in direct confrontation with the public present, although qualified, and in reading press comments.

It is the opinion of the committee that, in a democratic system, rationality and consensus should have equal weight in determining advantage of the options to the public. Therefore, attention only to the technical factors of evaluations cannot suffice for deciding on reliable grounds, if the institutions do not show that they give adequate importance to the difficult aspect of consensus.

The committee believes, therefore, that incisive action of information and illustration of the exact quantitative terms of Italy's energy problem inherent in safety of the plants and in protection of the environment and of the population is indispensable.

B. The Higher Health Institute

Among the contributions to the Venice Conference, the one by the Higher Health Institute, which, because of its powers, should be specifically interested in shaping an opinion aware of the problem raised by nuclear powerplants, brought up essentially institutional problems. The committee was of the opinion from the first meeting that participation by an expert from the Radiation Laboratory of the Higher Health Institute was indispensable for performing the tasks and for a direct comparison of opinions developed in various institutional circles.

Therefore, the committee must regretfully take note of the fact that the Higher Health Institute has decided, for reasons that do not appear to be clear, if the unacceptable motivation of the conflict between various state administrations is ruled out, to follow the course of criticism from the outside and a posteriori. On the one hand, this leaves open certain problems that might have been solved in an active collaboration. On the other hand, it accentuates certain prejudicial issues of unavailability, which are of themselves a problem without offering any additional guarantee to public opinion.

It is worth pointing out, in this connection, that other agencies with specific responsibilities in the sector, like the Consultative Committee of Experts for the Caorso Powerplant, have decided, more correctly, to take an active part during the course of the work, furnishing data, documents, specific questions and opportunities for discussion.

Therefore, the committee can only hope that criticism of the choices and and of the government's decisions, necessary and useful if carried out properly on the political level, will accompany development of an equally necessary constructive collaboration on the technical level between agencies and institutions interested in the problem. In any case, the importance that has been given to the stand taken in Venice by the director of the Higher Health Institute makes it necessary to emphasize, with regard to an evaluation of the contents, that his speech sharply criticizes the behavior of the committee on the formal level, but does not contradict the replies given to the questions put to the committee.

C. The Emergency Plans

When the committee set forth its own reply to question No 4, pertaining to the emergency plans, it expressed some reservations concerning the validity of the plans themselves and, moreover, formulated recommendations and suggestions.

Reservations of requirements stressed in the committee's report found substantial confirmation in the context of the speeches made during the conference and the minister of Budget, Economic Planning [and Regional Affairs] committed the government, in the closing speech, to the following in the specific sector:

a. To devote particular attention to the emergency plans in anticipation of hypothetical however much unlikely incidents, acknowledging the initiatives already taken by the minister of Interior for the purpose of eliminating the difficulties connected with the nature of prudence customarily given to the plans and with the fact that the law does not provide explicitly for participation of the regions and of the local authorities in preparation of the plans themselves.

b. To guarantee careful revision and timely updating of the plans with the collaboration of the regions and of the local authorities.

c. To give the plans themselves very desirable publicity.

d. To coordinate the plans on the national level, so that they will be a model and basis for taking action, in the broader context of civil protection, in case of natural calamities.

The committee is pleased to note that:

1. In connection with points b and c, the minister of Interior, by accepting and taking over the commitment assumed by the government, has undertaken to disseminate the necessary instructions to the prefectures concerned with circular letter No 139/020/5, dated 8 [sic; should read 6] February 1980 (appended).

2. In connection with point d, reference can be made only to Law 8/12/1970 No 996, on civil protection, making the minister of Interior responsible for making advance arrangements in this matter and for coordinating all action of help and assistance in case of catastrophe or natural calamity.

Special Remarks

Finally, the committee is of the opinion that it should stress the followin points in particular:

1. Preliminarily, it was pointed out as an impropriety that the committee was set up on the initiative of Ministry of Industry alone. In this connection, although the committee does not feel that it is criticized by that remark, it wishes to point out that, from a substantive point of view, cognizance with regard to health, biology and radioprotection was present within the scope of the committee. Moreover, as was amply stated in the report, the committee availed itself of the collaboration of experts in specific sectors to coordinate and support that cognizance.

2. It must be emphasized that the committee does not replace any of the responsibilities and powers of the various agencies provided by current legislation and regulations on nuclear matters, because its nature is only consultative. With regard specifically to health aspects, it is pointed out that institutionally two experts from the Ministry of Health are members of the Technical Committee for Nuclear Safety and Health Protection (covered by article 11 of DPR [Decree of the President of the Republic] No 185), which has always expressed unanimously its own opinion favorable to all the nuclear plants constructed in Italy.

3. In ponting out again the purely consultative nature of the committee, it is perhaps superfluous to emphasize that, differently from the Kemeny Committee appointed by the president of the United States as a result of the TMI [Three Mile Island] incident, it has not acted and should not act as a committee of inquiry.

Rather it is designed as a place for comparison and evaluation of data and arguments proposed by various sources. This explains, among other things, the presence on the committee of some members operating in state organizations or agencies active in the sector and who are, however, members of it on a purely personal basis.

4. With regard to the criticism of the committee for not having taken into account the facts that came out from the TMI incident, the committee can only confirm what has already been said, that any conclusion would have been regarded as premature, in view of the development still in progress on the issue involved. Among other things, recent publication of the so-called Rogovin Report, published during the Venice Conference, confirms this.

The committee has been of the opinion that the appointed agencies are perfectly capable of following the technological and regulatory development in this connection. Moreover, the results of the Kemeny Report pertaining to health have been cited.

5. The committee has noted with interest the experience acquired in Emilia with regard to the Caorso powerplant and it believes that it shares very generally the seven main points summarizing that experience, set forth by the president of the region, most of which, moreover, are already contained in the committee's recommendations.

With regard to Caorso, after drawing up the report, the committee received a questionnaire from the Consultative Committee of Experts for the Caorso nuclear powerplant.

The committee is answering that questionnaire directly with a separate document.

6. Some of the criticisms of the report were focused on the issue of the greater or smaller danger of low doses of radiation.

Regret was expressed both in the minority report and in various critical speeches in Venice that the committee did not take into account the existense of estimates of dose-effect coefficients more restrictive than the ones adopted by the responsible agencies. In fact, instead, the issue was discussed in the report, in the last paragraph of appendix 6.1 (pages 96-97), in which note is taken of the existence of those different estimates and the reason why they are not accepted by the responsible scientific agencies is explained.

Enclosure

MINISTRY OF INTERIOR
General Directorate of Civil Protection

Civil Protection Services
Civil Protection Division

Rome 6 February 1980

Subject: Nuclear energy -- Revision and updating of outside emergency plans.

To the prefects of Alessandria, Bologna, Caserta, Cosenza, Cremona, Frosinone, Latina, Leghorn, Matera, Milan, Novara, Palermo, Parma, Pavia, Piacenza, Pisa, Rome, Varese, Vercelli, Viterbo.

And for information:

To the Office of the Prime Minister

To the Ministry of Industry, Commerce and Handicraft

To the Ministry of Health

To the National Committee for Nuclear Energy -- DISP

To the State Commissioner in the Sicilian Region

To the Government Comissioners in the Piedmont Region, the Lombardy Region, the Emilia-Romagna Region, the Tuscan Region, the Latium Region, the Campania Region, the Basilicata Region, the Calabria Region.

1. As is known, the National Conference on Nuclear Safety was held in Venice from 25 to 27 January 1980, in which the Consultative Committee for Nuclear Safety, set up by decree of the minister of Industry, Commerce and Handicraft, dated 13 August 1979, submitted the report containing replies to five questions asked of it by the Standing Technical Committee for Energy.

2. The subject matter most directly concerning the powers and responsibilities incumbent on Interior Administration, on the central and provincial level, was discussed in response to question No 4 (chapter 7 in the report), with regard to adequacy or inadequacy of the criteria for emergency actions to meet the requirements of safety and safeguarding of the people.

The committee -- which, in order to carry out the mandate received has acquired the external emergency plans of the existing nuclear powerplants, has dwelt on "reference incidents" taken as the basis for determining the technical premises of outside emergency planning -- expressed the opinion (chapter 7.3) that the plans examined "are general in some cases and imprecise from some points of view," pointing out in particular that the "mechanism for circulating information and for alerting the public and also the liaison systems ... do not seem to be suitable for offering sufficient guarantees of prompt, effective application" and that, "in addition, they lack an organic provision of a suitable technical structure, constantly available to support the cognizant authorities in handling an emergency and that will be capable of interpreting the development of events within the plant and of the impact on the environment."

The report then deals with the so-called "residual risk" (hypothesis of a nuclear incident with very slight probability of happening but with rather more serious effects on the environment than the ones anticipated in the emergency plans) on the basis of a document in which the consultative committee was of the opinion not to "specify certain factors that may support opinions and conclusions of the document" itself.

3. The committee is conclusively of the opinion (chapter 7.5) that:

a. The technical premises of the emergency plans seem to be adequate for the requirements of safety and safeguarding of the people.

b. Due attention should be paid to the systems for diagnosing the radiometric situation and also the systems and structures for forecasting the possible evolution of plant events, also for the purpose of providing the necessary technical support of the cognizant authorities in handling an emergency.

c. Because the plans now prepared do not seem suitable for fully achieving the appropriate objectives, they should be revised and updated with participation by the regions and local authorities. For this purpose, current legislation on the subject should be revised (the committee has, however, taken note -- chapter 7.3 -- of the directives handed down by this ministry with note No 145/020/8, of 4 August 1979, for participation by the regions and local authorities both in the compilation or revision and updating phase and in the phase of plan implementation).

d. The public should be given timely and complete information on aspects connected with the presence of a nuclear powerplant, on the contents of the emergency plans and on the activity and collaboration that the people should give also from the point of view of self-protection.

e. The following should also be provided in the plants themselves:

(1). Suitable measures for satisfying, with adequate medical facilities (that obviously must be prepared by those authorities responsible for medical aid and assistance), requests for assistance stemming also from a presumable emotional state of population groups.

(2). Organization of suitable information links between agencies concerned with handling emergencies and also organization of an effective public information service.

(3). Suitable periodic operational checks be means of drills.

4. In order to express all the conclusions and recommentations of the consultative committee in operational terms and in harmony with subsequent evaluations that will be drawn from the National Conference in Venice in the cognizant bodies, pertinent initiatives and action by other administrations and agencies become necessary, by preparing or strengthening those structures representing the indispensable premise, so that the plans may prove to be operationally valid.

In this connection, it is believed necessary to refer specifically to environment and food inspection facilities and assistance facilities and sanitation and health inspections, whose inadequacy is essentially one of the most important causes of the deficiencies of the emergency plans. Moreover, these deficiencies have already been pointed out by this administration, which has not failed to strive to remove the above-mentioned causes both centrally and peripherally.

This ministry realizes, nevertheless, that it is advisable to acquaint the prefectures concerned immediately with the text of the above-mentioned report and, at the same time, to order that all plans be accurately revised and updated for the twofold purpose of:

a. Eliminating possible ambiguities and generalities.

b. Introducing, whenever possible, improvement innovation in the light of the conclusions of the consultative committee.

5. In order to attain the objective stated in paragraph 4a, the following suggestions are made, among other things:

a. To check all the data contained in the plans (including the telephone numbers by means of which, as an alternative for other systems to be stated in the plan at any rate, it is ensured that those responsible for carrying out the planned measures can be located in case of necessity).

b. To check whether the tasks incumbent on each administration or agency have been specified well and have been stated clearly in the order in which they are going to be carried out in case of emergency. Provision must be made, where necessary, for having the individual detailed plans reworked by the cognizant administration or agency.

c. To eliminate in all possible cases, any general statement (of the type of: "the one cognizant," "to be established" or "to be determined at the proper time," "to be reconciled" or "to be specified subsequently," and so on, or, as has already been pointed out, statements that should be deleted at once, with which it is realized that it is impossible to formulate operational provisions owing to the lack of information or data) and they should be replaced with statements having a concrete context.

Wherever premises are involved -- to be reduced, however, to the indispensable minimum -- that it is regarded as advisable (like instructions issued with the above-mentioned note of 4 August 1979) for them to continue to be reserved to the prefectures and commands or state bureaus concerned, but always resorting to concrete formulations, referring -- without mentioning them -- for specifications, to plans in possession of the responsible authorities (for example, for roadblocks, it might be stated in the plan that "for the purpose of ... roadblocks are set up at points already determined by the command ... with personnel belonging to police or military corps").

d. To review all the operational preparations to put them in a more clear-cut form, so that, if necessary, the plan may actually be, for whoever is obliged to apply it, a guiding instrument for prompt, effective implementation of the measures.

The need for the following is pointed out, then, for purposes of the improvement innovations referred to in paragraph 4b.:

aa. Measures pertaining to medical assistance of the public are subjected to checking, in order to ascertain whether the existing medical structures are adequately utilized, within whose scope, handled by the provincial medical personnel or agencies responsible for medical assistance, operational provisions to be implemented in case of need must be made.

bb. Food control measures for people and animals are to be subjected to checking, similar to the checking stated in paragraph a, above.

cc. Liaison systems between all the state and regional agencies and the local authorities concerned in handling emergencies must be reviewed providing, where necessary, for increasing the means of communication (wire and/or radio) and implementing, at any rate, any other measure suitable for providing appropriate, rapid exchange of informtion (in this connection, it is necessary to list in the plans all usable means of communication that sometimes are not mentioned in the plans themselves, like, for example, "point-to-point"telephone links, already activated in some parts, between the nuclear powerplant authorities and the prefectures and firefighting commands).

d. In addition to the familiar warning leaflets to the public (leaflets whose text can be modified without hesitation in the form believed locally to be most consistent with the purpose), warning systems must be provided in the plans with the use of other means, by making, among other things, appropriate agreements with local radio and television broadcasters.

e. Activation of an information center must be provided and planned, with specification of its composition, responsibilities and tasks. In case of emergency, it is to be the official spokesman of the public authorities, to give an accurate picture of the situation and correct suggestions for the behavior of the public.

In addition, periodic checks of the plans must be scheduled with drills in which the operational components are involved, sometimes in part, sometimes all.

Any other initiative can be actuated by the individual provincial committees, in order to make the plans suitable instruments for ensuring orderly, effective action as early as possible, when possible incidents occur.

It should be added, in this connection, that each administration or agency must take it on itself to keep its own detailed plan constantly up to date, informing the prefecture immediately of any modification made.

Moreover, the plans must be subjected to updating and to revision strictly in accordance with the terms specified in article 117 of DPR No 185, of 13 February 1964.

With regard to interprovincial plans, the prefectures concerned must make suitable agreements, so that revisions and updating will take place in the same period. In addition, the plans themselves must be appropriately coordinated (article 118 DPR No 185/1964) in their operational contents. For that specific purpose, it is not enough for the plans of the other provinces concerned merely to be appended to the plan compiled by the province in which the nuclear plant is located.

6. As was stated in paragraph 3d, the consultative committee also dwelt on the need for timely, complete information of the public. Obviously, an orderly program in this sector requires careful preparation and gradual implementation, also for the purpose of preventing unjustified alarmism and false speculations.

At any rate, it seems necessary for this important, critical problem to be tackled responsibly locally also with the collaboration of authorities, organizations and institutes not represented on the provincial committee (like the ones operating in the field of public education, scientific research and information), in order to implement gradually, as has been said, any sound initiative intended for providing the public with objective information on every aspect connected with the existence of a nuclear powerplant and on appropriate rules of self-protection.

7. In order to achieve the predetermined objectives, full, working collaboration especially of all the state agencies represented in the provincial committee, covered by article 115 of DPR No 185 of 13 February 1964, of the CNEN (National Nuclear Energy Commission), of the plant operators and also of the regions and local authorities is indispensable. Their contribution

as stated in the above-mentioned note of 4 August 1979, is now crucial, in view of the familiar transfers of cognizance and of delegations of duties that have occurred in many matters already incumbent on state offices represented on the above-mentioned committee.

The prefects are urgently asked to ensure that the problems of planning for outside nuclear emergencies will receive personal, careful, constant attention, while for the purpose of the desired broader and more concrete collaboration, especially by the regions and the agencies under them, assurance of the effective interest of the government commissioners, in the ways regarded as most appropriate, is also given.

We await news on the initiatives that will be put in effect and on the results that will be achieved.

8. The courteous attention of the Ministry of Health is invited to all that was stated in paragraph 4 for action under its cognizance, for purposes of preparing adequate environment and food inspection facilities and also medical assistance facilities and sanitation and medical inspections.

The text of a speech made in the Venice Conference is forwarded to the same ministry in this connection for pertinent evaluation.

The CNEN is strongly urged with regard to the initiatives under its cognizance and any appropriate suggestion, so that the conclusions covered by chapter 7.5,b of the report of the consultative committee, likewise referred to in the preceding paragraph e,b, may be expressed in operational terms.

9. The present letter is also addressed to the Prefecture of Viterbo, for appropriate information, in view of the tasks to be assigned to it in due time for compilation of the outside emergency plan for the scheduled nucleoelectric powerplant at Montalto di Castro, to which the consultative committee has likewise devoted its own attention.

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SWITZERLAND

NUCLEAR POWER PRODUCES 30 PERCENT OF SWISS ENERGY

Geneva JOURNAL DE GENEVE in French 9/10 Aug 80 p 5

[Article: "Swiss Nuclear Energy Generates 30 Percent of Electricity--It Has Doubled in 1979 With the Addition of Goesgen Plant"]

[Text] Bern, 8 (ATS) [Swiss Telegraph Agency]--Goesgen-Daeniken nuclear complex commercial exploitation start-up has almost doubled Swiss nuclear-generated power in 1979. In addition, the nuclear energy share of the national generating capacity of electricity has been raised to approximately 30 percent; thus, covering some 6 percent of Switzerland's energy needs reports ASPEA [Swiss Association for Nuclear Energy] in its 21st annual report.

With a production of 5.595 millions MW/h, Beznau (Aargau) twin nuclear powerplants, each equipped with a 350 MW reactor, have reached a very high load coefficient: 87 percent for Beznau-1 and 88 percent for Beznau-2. Since the first unit was started at Christmas 1969, Beznau twin units have together generated 45.2 millions MW/h. Muhleberg (Bern) nuclear powerplant, a boiling water unit, has exceeded its 1978 production level, reaching a gross production of 2.602 millions MW/h. In term of on-line performance, in a comparison at international level, this result keeps Muhleberg in the forefront of boiling water nuclear plants, which have to go through an annual fuel exchange, indicates ASPEA's report.

On 20 January 1979, trial runs for Goesgen-Daeniken (Solothurn) were started by initiating the first self-sustained chain reaction. This plant, a pressurized water unit, was first connected to Swiss electrical grid on 6 February 1979. In addition, plant provides live steam to a cardboard plant in Niedergoesgen. On 19 November 1979, competent authorities have authorized its commercial exploitation.

Leibstadt, Kaiseraugst, Graben

As far as Leibstadt is concerned, ASPEA's report notes its advanced stage of construction. The water cooling tower shell having already been completed in the summer of 1978, the cooling system technical installations were assembled during the just completed building period. High and low pressure turbines and alternator have been completely assembled. This plant is designed for a nominal power of 942 MW; it is equipped with a boiling water reactor. Completion and start-up operations are scheduled for 1982.

With the exception of some infrastructural work, nothing has been yet started at Kaiseraugst (Solothurn) site. ASPEA's report indicates that Kaiseraugst Nuclear Energy Company Ltd. applied on 25 July 1979 for a general building permit for this project. After a review by Federal Energy Commission, a decision will be reached this year yet by Swiss Government and parliament. The Kaiseraugst plant, of a nominal power of 925 MW, will be equipped with a boiling water reactor.

Graben (Bern) nuclear powerplant has received a siting authorization and, since October 1977, all the necessary water and construction permits from Bern canton. The nuclear construction permit and general authorization which are now required, after the revision of nuclear energy act, have still not been delivered. Equipped with a boiling water reactor, this plant should have a nominal power of 1140 MW.

Verbois Powerplant

As for Verbois (Geneva) nuclear powerplant, which has received a siting authorization in 1974, preliminary studies by Western Switzerland Power Company Ltd, Lausanne, have continued. An economic analysis for a remote heat transmission scheme, connected to this plant, done with the use of a theoretical model, has produced a design project for the required technical installations. Separately, other regional impact studies have been conducted in liaison with interested parties, particularly Geneva public utilities authority.

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